60-1772

AERONCA MANUFACTURING CORPORATION
AEROSPACE DIVISION

HILLTOP AND FREDERICK ROADS
BALTIMORE 28, MARYLAND
RIDGEWAY 7-0200

March 1, 1960

25X1 [redacted]

211 Barton Hall
Central Intelligence Agency
2430 E Street, N. W.
Washington 25, D. C.

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At your request, forwarded with this letter is a copy of the Space Strategy presentation which was recently given to you by Dr. Peter A. Castruccio, Technical Director of the Aerospace Division of the Aeronca Manufacturing Corporation.

We are sincerely pleased at your evidence of interest in the Aerospace Division's capability, as demonstrated by the presentation, and hope you will keep us in mind should your requirements fall into the areas of our capability.

As Dr. Castruccio pointed out, and as the enclosed brochure will illustrate, the Aeronca Manufacturing Corporation offers a capability ranging from electronics through airframe special structures, as well as space-oriented studies and hardware.

As we are a young and vigorously expanding division, we can give your requirements the same enthusiasm with which the Space Strategy presentation was given, and offer the same calibre of development acuity.

At our recent presentation to you, the comment was made that a more thorough discussion of the developments and the hardware necessary to implement space strategy was lacking from the presentation. These were necessarily omitted due to the classification level of the presentation, and for lack of time. We shall be happy to arrange another meeting with you at a higher security level, to discuss our proposals for necessary space development and hardware.

IF ENCLOSURES ARE WITHDRAWN (OR NOT ATTACHED) THE CLASSIFICATION OF THIS CORRESPONDENCE WILL BE CANCELLED IN ACCORDANCE WITH PAR 25E AF REGULATION 205-1 OR NAVY REGULATION ARTICLE 76 (5) (H).

We frankly and openly solicit your requirements based on our capability to handle anything from the simpler electronic development and production to complete space systems.

Sincerely,

C. N. Valenti, Manager
Military Requirements
Marketing Department

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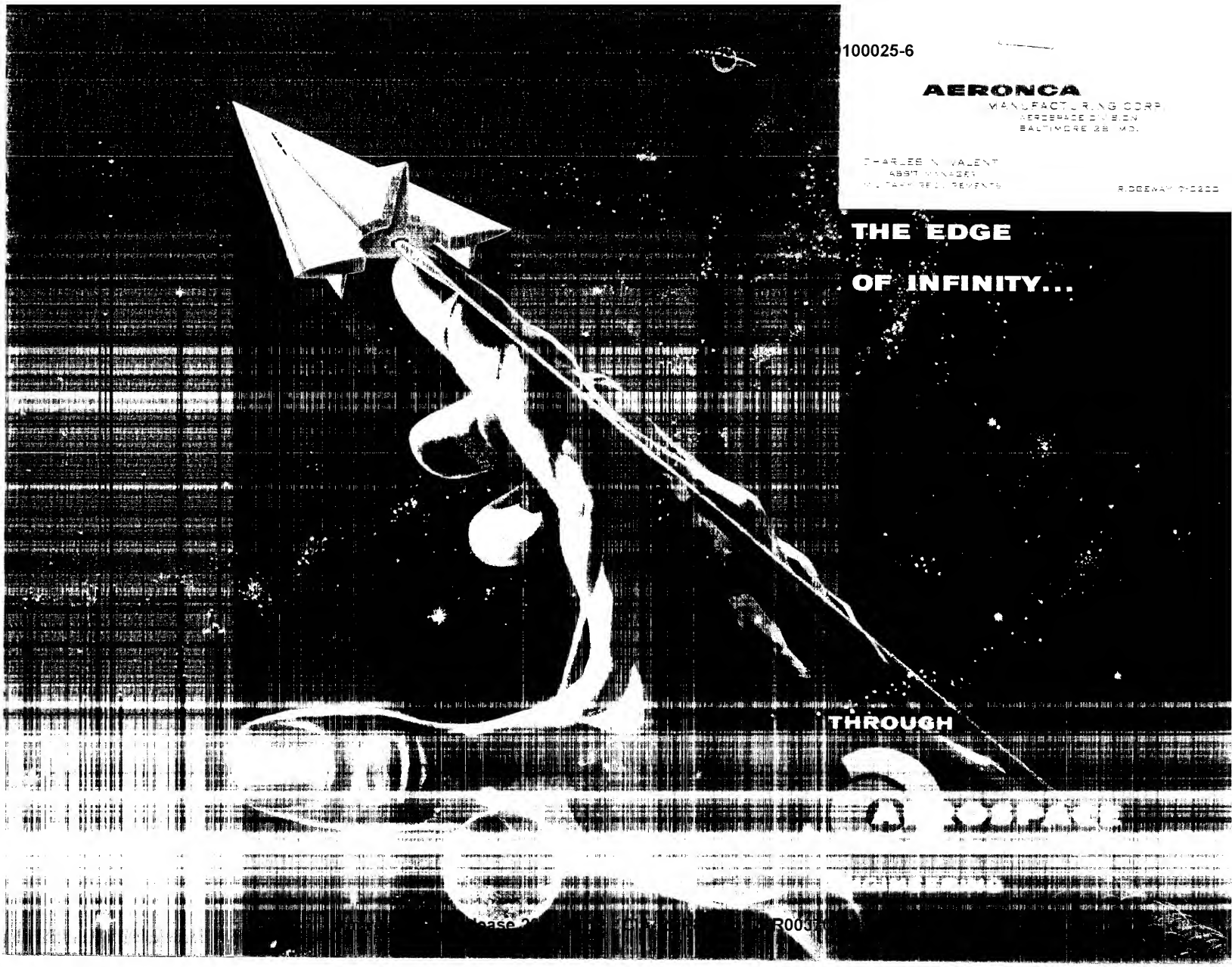
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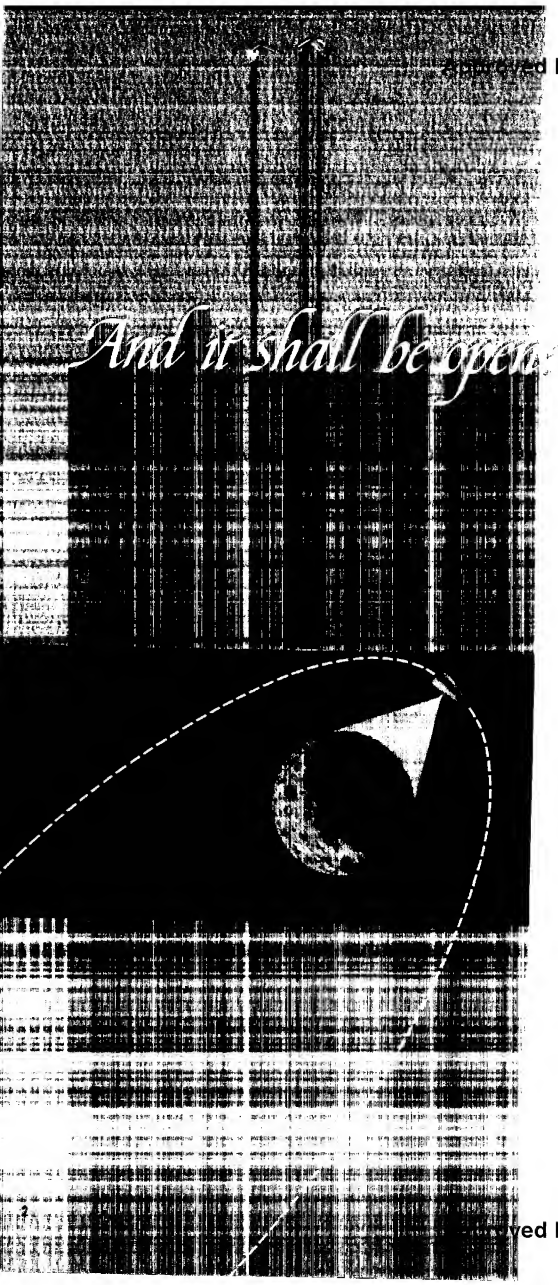
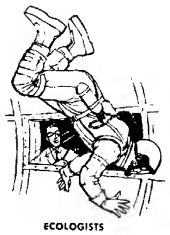
AERONCA
MANUFACTURING CORP.
AEROSPACE DIVISION
BALTIMORE 28, MD.
CHARLES N. VALENT
ASST. MANAGER
MILITARY SALES DEVELOPMENT
R.DCEMAY 7-0220
THE EDGE
OF INFINITY...
THROUGH



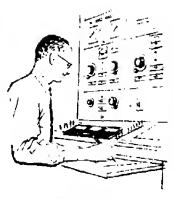
Man's destiny has brought him to the threshold of space. The first Astronaut soon will belong to the ages. But even before he does, men of bold vision are planning for lunar and interplanetary exploration. This is an exciting, challenging, profound moment in history. We are privileged to witness mankind's transition into the horizonless Space Age.

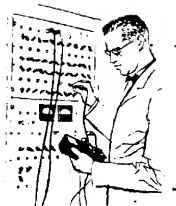
To meet the challenge of space and the future, Aeronca has established the Aerospace Division . . . a scientific facility dedicated to astronautics and the practical application of advanced technological knowledge. This booklet is a brief outline of this new facility, its people, capabilities and services.

P. A. Castruccio
Technical Director


ECOLOGISTS


AERODYNAMICISTS


ELECTRONIC ENGINEERS


GUIDANCE ENGINEERS

BACKGROUND

FOR THE

To develop feasible

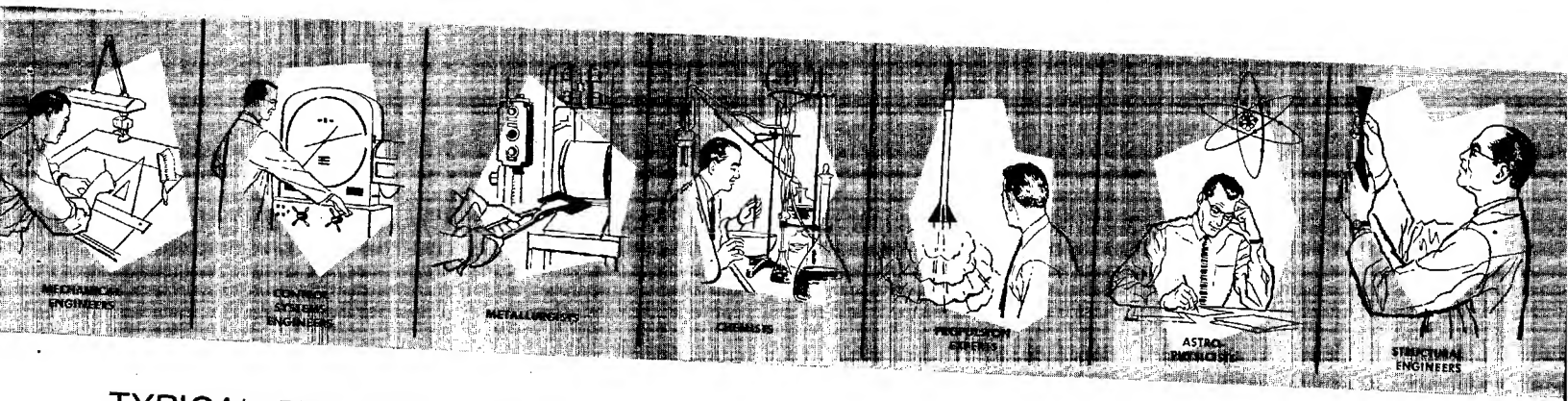
AERONCA

AEROSPACE means creative engineering for air weapon and astronautic systems

Aerospace Division offers unique capabilities in missile and space engineering and manufacturing. A fully integrated facility, it specializes in research, development, design, test and prototype manufacture of air weapon and missile sub-systems and components.

In recognition of the importance of flexibility, authority and economy in project management, the delegation of responsibility has been given prime consideration in this division's organization. All operations are coordinated to assure strict adherence to each customer's needs and directives in all matters . . . contractual, technical, managerial and administrative.

In addition to its creative services, Aerospace provides competent contracting, purchasing, accounting and general administrative support on all programs.



TYPICAL STUDIES AND PROJECTS

Attitude Control System for Space Vehicles

High-Temperature Ceramic Adhesives

Computer Programmers

Digital Loggers and Output Units

Infrared and Ultraviolet Research

Guidance & Navigational Techniques in Space Flight

Lunar Landing Techniques

Lunar Observatory

Midcourse Guidance for Space Vehicles

Space Trajectories

Space Communications Techniques

Space Telemetering System

Strategic Lunar System

Strategic Interplanetary System

AERONCA

AEROSPACE

CAPABILITIES

There is much to be learned and accomplished before man can successfully probe the edge of Infinity. Studies indicate that space will be a hostile environment . . . both physiologically and psychologically. Even unmanned space probes present critical challenges to contemporary knowledge.

The responsibility for reliable, assured performance in space as well as missile systems lies with the people capable of creating them. Recognizing this obligation, Aerospace personnel are relentless in their search for perfection. Their goal is optimum results and quality assurance on each project.

Approved For Release 2003/08/18 : CIA-RDP80B01676R003700100025-6

AEROSPACE provides Management, Research, Development, Design and Production Services for . . .

SYSTEM STUDIES
- *Missiles* — AICBM Threat and Defense Weapon System Studies
- *Space* — Strategy, Logistics and Military Applications
- *Space* — Environment, Exploitation, Earth Orbital, Lunar and Interplanetary Studies

GUIDANCE, NAVIGATION, CONTROL AND STABILIZATION SYSTEMS
- Inertial
- Radar and Radio
- Magnetic and Advanced
- Optical, Ultraviolet and Infrared
- Trajectory Individualization, Computation and Control

COMMUNICATIONS AND TELEMETRY
- Radio
- Light
- Sound
- Antennas
- Transmitters, Receivers and Decoders (HF to Microwave)

DETECTION, TRACKING AND RECONNAISSANCE
- Radar
- Radiation
- Electronic Counter Measure and Anti-Jamming
- Active/Passive Detection
- Optical, Ultraviolet and Infrared

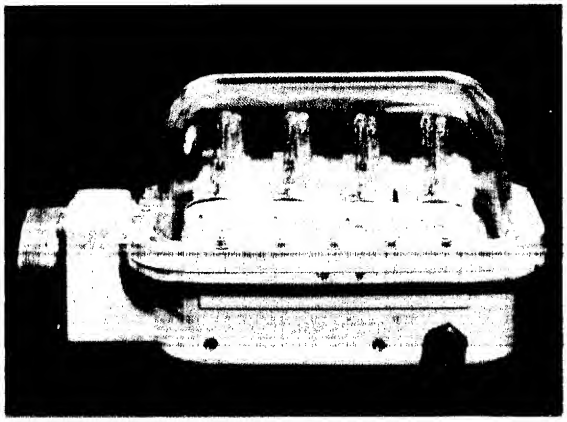
ECOLOGICAL, HUMAN PROTECTION, CAPSULE DESIGN
- Open and Closed Loop Systems
- Radiation and Temperature Protection
- Physiological/Psychological Studies
- Capsule Instrumentation and Design

SIMULATION AND TRAINING
- Space
- Navigation and Communication
- Missile and Radar
- Research

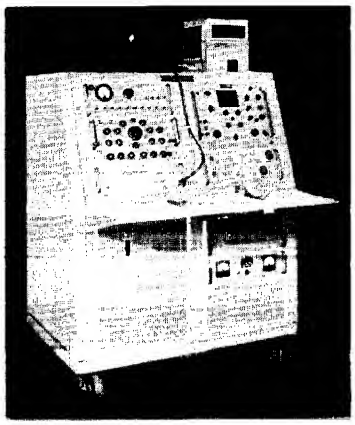
DIGITAL AND ANALOG COMPUTATION AND DATA PROCESSING
- Data Translators
- Multiplexers
- Data Loggers and Processors
- Electromechanical Systems

TEST, CHECKOUT AND INSTRUMENTATION
- Automatic System Monitoring Equipment
- Special Electronic and Electro-mechanical Instruments
- Weather Recording, Automatic and Semiautomatic

Improved attitude reading device for plotting attitude of missiles from film taken during flight.



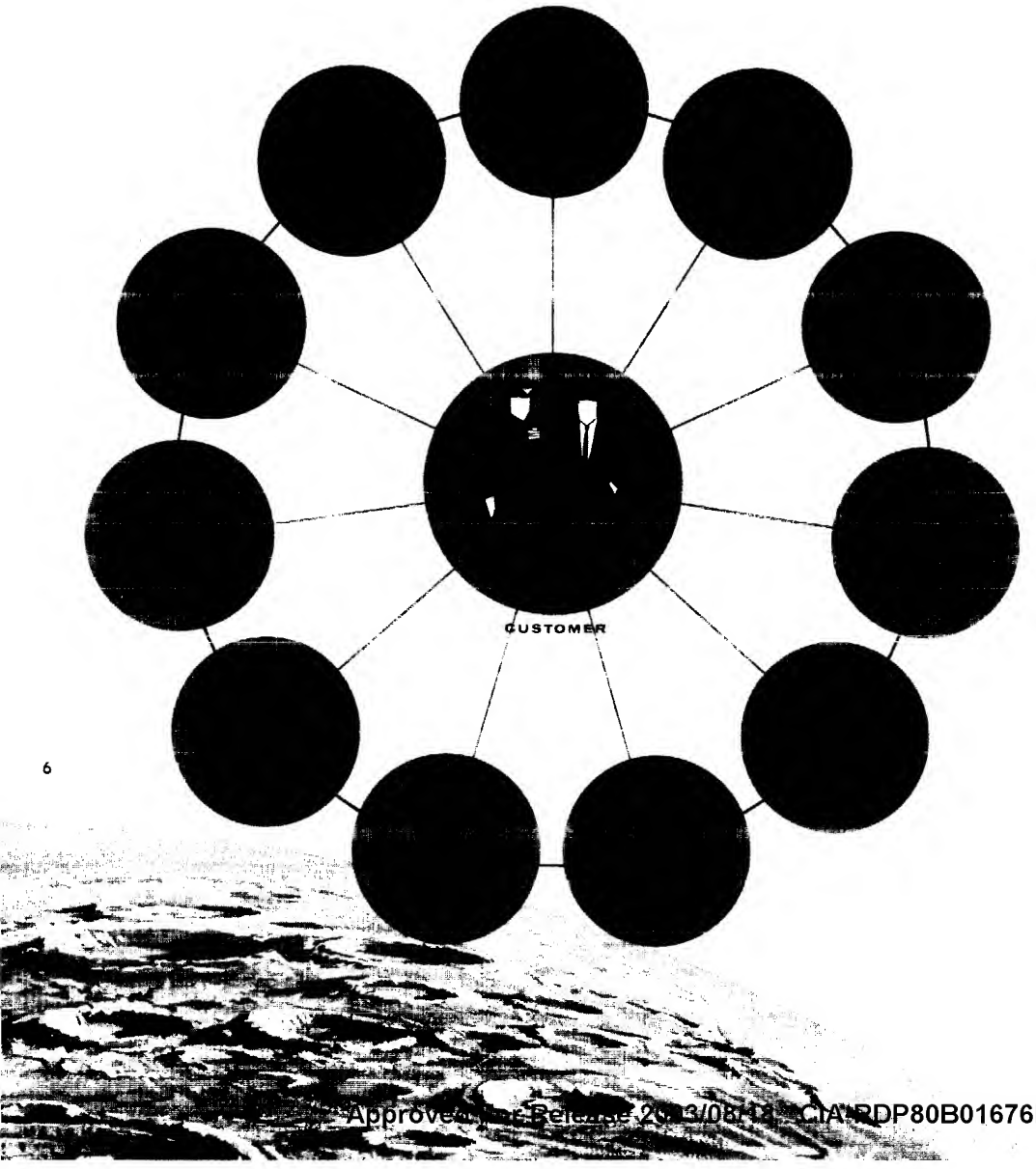
Lamb pod of infrared flashing light used for tracking missiles against the stars.



Component checkout equipment for airborne missile system. Entire airborne system and group support units developed by Aeronca.

AERONCA

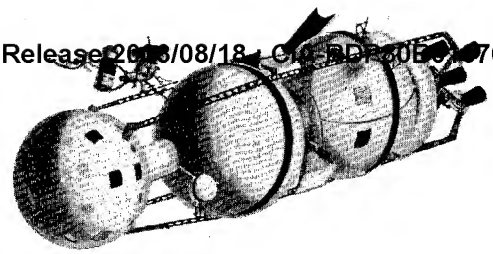
AEROSPACE



● Key to successful systems management is a thorough knowledge of military requirements and weapon systems. To assure efficient management, Aeronca utilizes the "closed loop". A single manager, with a full-time staff, is responsible for coordination of schedule planning . . . integration of research, development, design and test efforts to meet performance specifications . . . direction and supervision of subcontractors.

● Aerospace research is directed to provide support for concepts and techniques based on system requirements. Effort is oriented to: (a) develop background necessary to select best possible techniques for system design, (b) develop competence for proper integration of system equipment, (c) advance state-of-the-art to meet future space requirements. To accomplish this mission, Aeronca has established versatile and fully staffed research and laboratory facilities.

● Complex weapons impose severe performance criteria which dictate that each individual program be carefully planned and directed from the beginning. The parameters which must be planned into a project include determination and allocation of specifications, establishment of reliability, operational and environmental aspects and establishment of design factors. This can be accomplished only by a well-balanced organization staffed with experienced personnel. Aeronca has demonstrated an outstanding ability to achieve this objective.



SERVICES

A worthwhile design based on the parameters set forth by the Research and Systems Engineering teams is the goal of the Design group. Producibility of all components and subsystems is given prime consideration because Design, to be successful, must be transformed into workable hardware. Aeronca's Design Engineering people have a wealth of skills and experience to meet this ultimate design goal.

Aerospace's Development Engineering group combines awareness of feasibility with the knowledge of design philosophy and techniques necessary to develop successful systems. With reliability, ease of operation and maintenance as their prime objectives, these specialists give Aeronca the capacity for new and diversified systems of all types.

The personnel who comprise Aeronca's Experimental Fabrication team are among the most skillful craftsmen in the industry today. They close the gap between the design/development engineers, blueprints and workable hardware.

Broad experience and a wide range of specialized skills are required of Product Engineering. This group must be competent in component reliability, manufacturing methods and processes and have an intimate knowledge of military specifications and test procedures. In addition, it is responsible for integrating methods and techniques for improving production.

The Test Group utilizes laboratories and special equipment to check out components and systems under actual as well as simulated environmental conditions. In addition, they assist in establishing specifications for new components, help select suppliers, conduct qualification tests and enforce specifications.

Transition of a project from drawing board to actuality is the responsibility of Production Engineering. Special talents in engineering, planning, scheduling, estimating, materials and manufacturing are blended into a practical, economical plan of action. As a result, final specifications and changes as well as realistic costs are quickly established.

Aeronca's extensive Manufacturing facilities are equipped with the most advanced machines and quality assurance test equipment. Manned by experienced personnel, these versatile facilities have the flexibility and capacity to mass-produce components . . . and expedite delivery . . . to complete customer satisfaction.

Based wherever required, the Follow-Up team renders these services:

1. Installation and maintenance of equipment.
2. Instruction of customers in theory, operation and maintenance.
3. Modification or relocation of existing equipment.
4. Planning and provisioning of spare parts.

CUSTOMERS

Aeronca and its Aerospace Division work closely with prime contractors and the Military. This partial list shows organizations with whom a working relationship is maintained.

U. S. Air Force

U. S. Army

U. S. Navy

U. S. Marine Corps

Arma Division, American Bosch Arma Corporation

Aluminum Company of America

Bell Aircraft Corporation

Bendix Aviation Corporation

Boeing Airplane Company

Convair, Division of General Dynamics Corporation

Douglas Aircraft Company, Inc.

Federal Communications Commission

General Electric Company

Grumman Aircraft and Engineering Corporation

National Aeronautics and Space Administration

North American Aviation

Sperry Gyroscope Co., Division Sperry Rand Corporation

Radio Corporation of America

TYPICAL PROJECTS

This list illustrates the type of projects that Aeronca has produced. Establishment of the Aerospace Division supports and expands the capabilities and services required to accomplish these projects.

- * Airborne Antenna Assemblies
- Air Transportable Support Shelters
- Aluminum Honeycomb Structures (Bonded)
- Boeing 707 Components
- B-52 Components and Subsystems
- B-58 Components (Stainless Steel Honeycomb)
- B-70 Components
- Ceramic Adhesive Development Program
- Ceramic Bonded Honeycomb Structures
- Jupiter Missile GSE Shelters
- KC-135 Wing Center Sections
- * Missile Components and Subsystems
- * Missile Substructures
- * P-106 and P-107 Target Missiles
- P6M Beaching Vehicle
- * Pogo-Hi Target Missiles
- A2-F Speed Brake
- Stainless Steel Honeycomb Structures (Brazed)
- * Radomes
- * Target Drones
- * Radar Transmitter and Receiver Reflectors

* *Aerospace Division Specialties*

AERONCA AEROSPACE

FACILITIES

CORPORATE

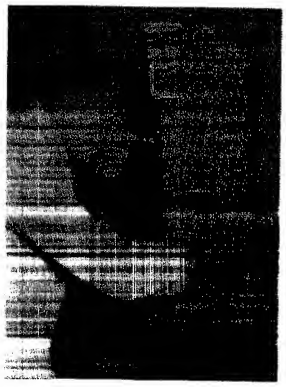
With more than 650,000 square feet among its three divisions, Aeronca has the capacity to handle a wide range of research, development and production programs for air weapon, missile and space systems. New and expanded facilities already have been planned to keep pace with the growing demand for Aeronca's services.

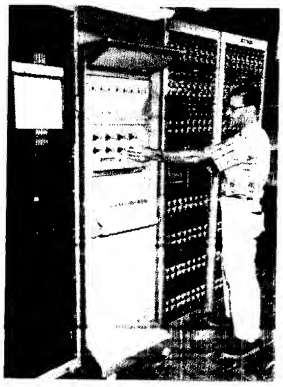
Within existing plant areas, Aeronca has the precision production equipment required to fabricate complex weapon systems and components. Modern supporting laboratories also are maintained, including an Environmental Laboratory capable of qualifying equipment to all present military specifications. In addition, Air Force certified procedures and methods are employed in fabrication of air weapon structures.

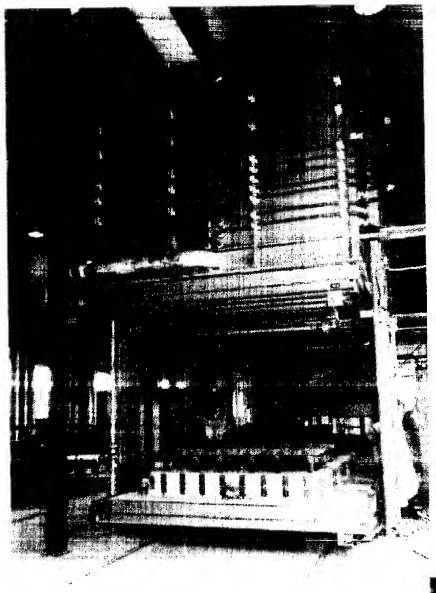
AEROSPACE DIVISION

Present facilities include 28,000 square feet of engineering space and a 2900 square foot Model Shop. An additional 20,000 square feet are being acquired to meet scheduled expansion plans. Present location is a 14-acre landscaped tract at Frederick and Hilltop Roads, Catonsville (Baltimore 28), Maryland.

Aerospace's Model Shop has the necessary equipment for prototype fabrication, and is manned by highly skilled electronic specialists and machinists. It has produced a variety of complex electronic and electromechanical assemblies for R & D projects.







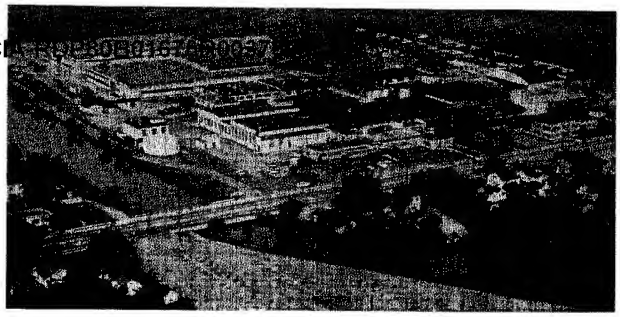
As a leading supplier of aircraft and air weapon system components, Aeronca has established an extremely versatile and fully integrated manufacturing facility. In addition to standard tools, Aeronca utilizes a variety of highly specialized machines and equipment developed especially to meet the rigid specifications inherent in high-performance weapon systems. Among these are ultraprecision contour mills used for high speed milling of unsupported honeycomb structures, an electronically controlled 90-ton spar mill, the most modern and largest nondestructive X-ray inspection equipment and environmental facilities.

The General Electric brazing furnace illustrated at left is typical of Aeronca's special equipment. This and other furnaces are capable of brazing stainless steel panels up to 10′ x 20′. Behind the furnace (left background) is a freezer capable of sustained —100° F. temperature.

MANUFACTURING FACILITIES

AERONCA AEROSPACE

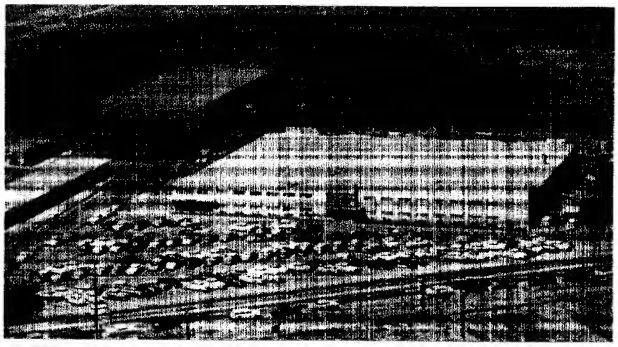
Numerically controlled, this 12′ x 45′ skin mill is the largest and most modern machine of its kind in the Midwest.



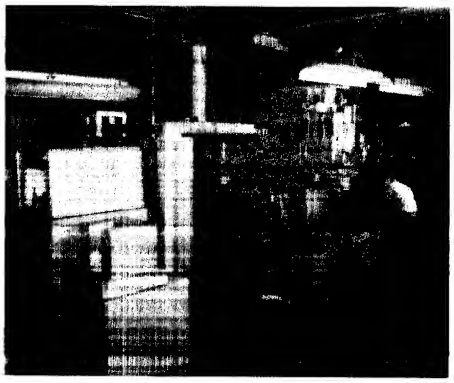
Main Offices and Plants located in Middletown, Ohio.

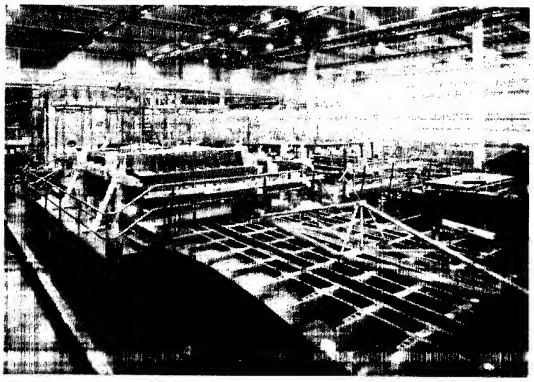
Aeronca's production capabilities are geared to supply . . . *on schedule and at competitive cost* . . . structures, components and finished products of the highest quality. Aeronca is proud of its advanced state-of-the-art knowledge, skills and equipment for fabricating exotic materials and complex structures. In fact, we currently are recognized as a prime source for brazed stainless steel honeycomb sandwiches.

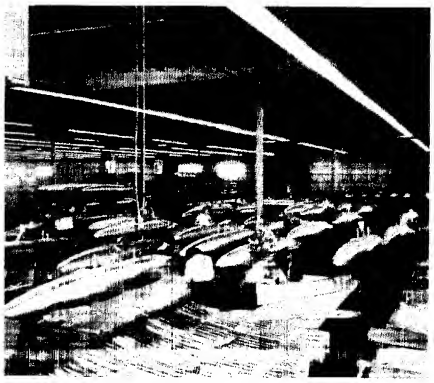
The full scope of Aeronca's current facilities cannot be illustrated with pictures or outlined in words. Therefore, we invite your personal inspection of our plants. We would like you to see how we operate and to get acquainted with our people. We sincerely believe you would be favorably impressed with all phases of Aeronca's operations.



Aerocal Division Plants, Torrance, California.





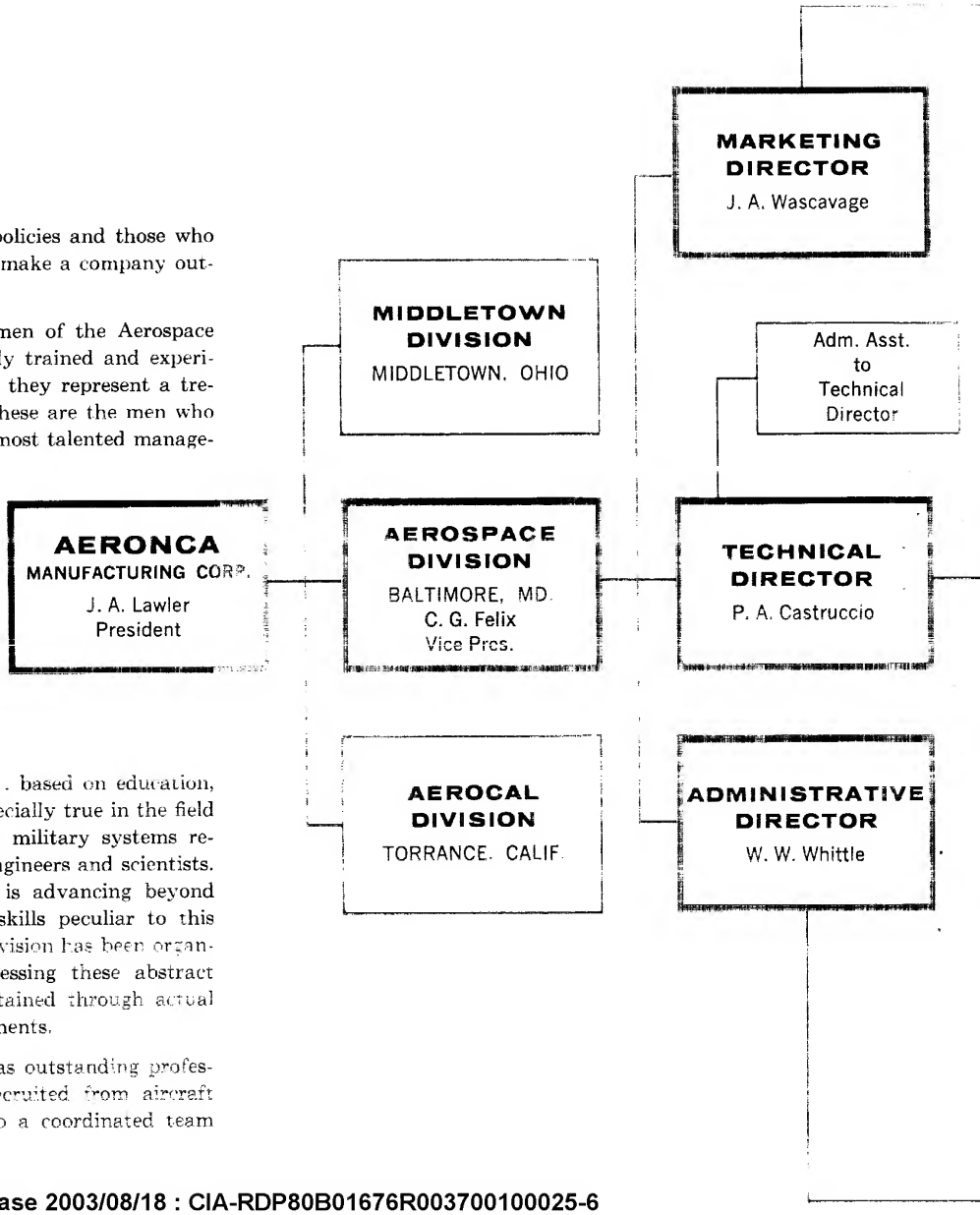


AERONCA

AEROSPACE ORGANIZATION

It is the *people* . . . those who make the policies and those who transform them into action . . . who really make a company outstanding in its field.

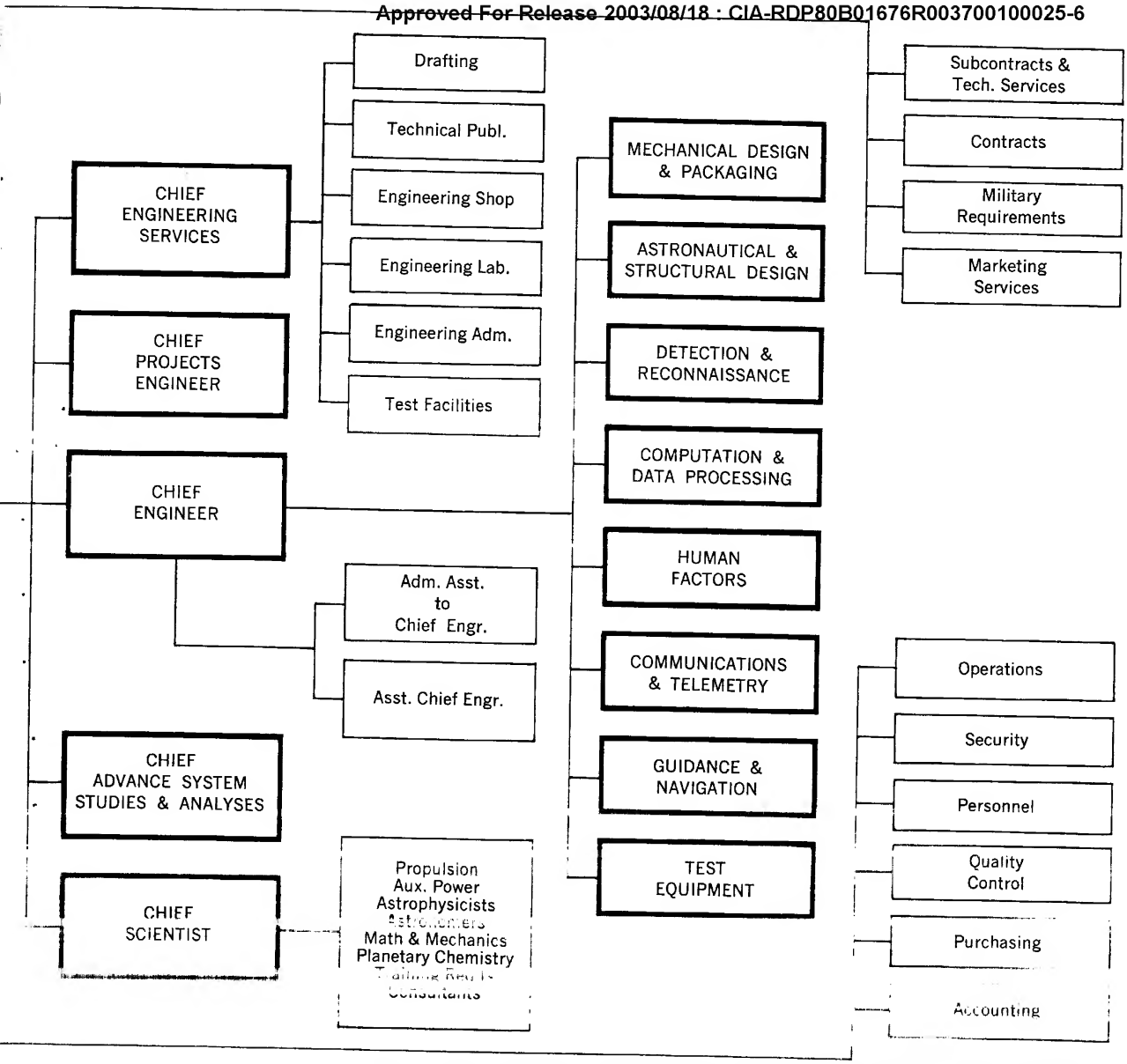
This organizational chart shows the key men of the Aerospace Division. Each is a qualified specialist, fully trained and experienced in his field of endeavor. Collectively they represent a tremendous range and depth of knowledge. These are the men who will handle your jobs. They are one of the most talented management teams in the industry today.

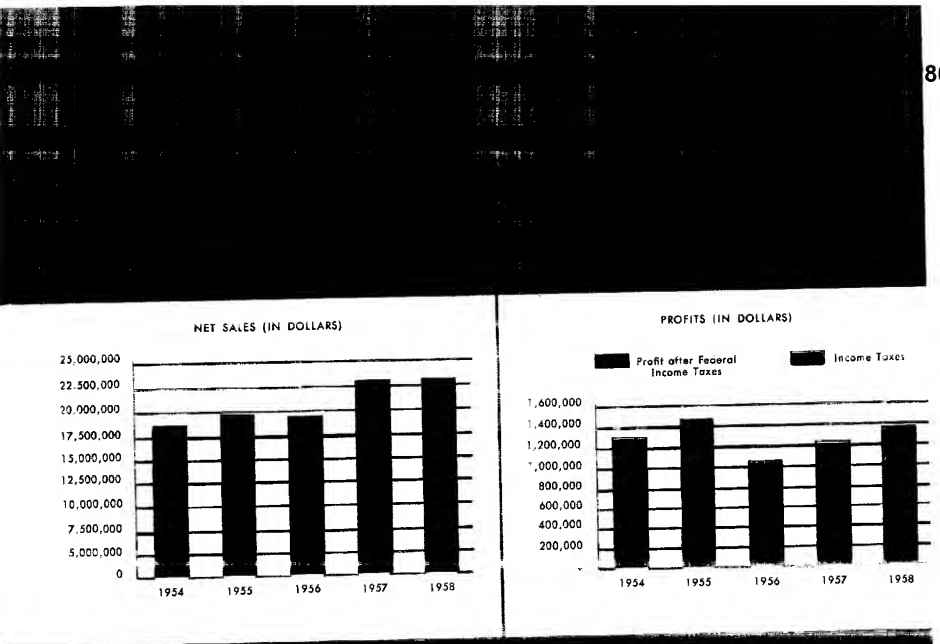


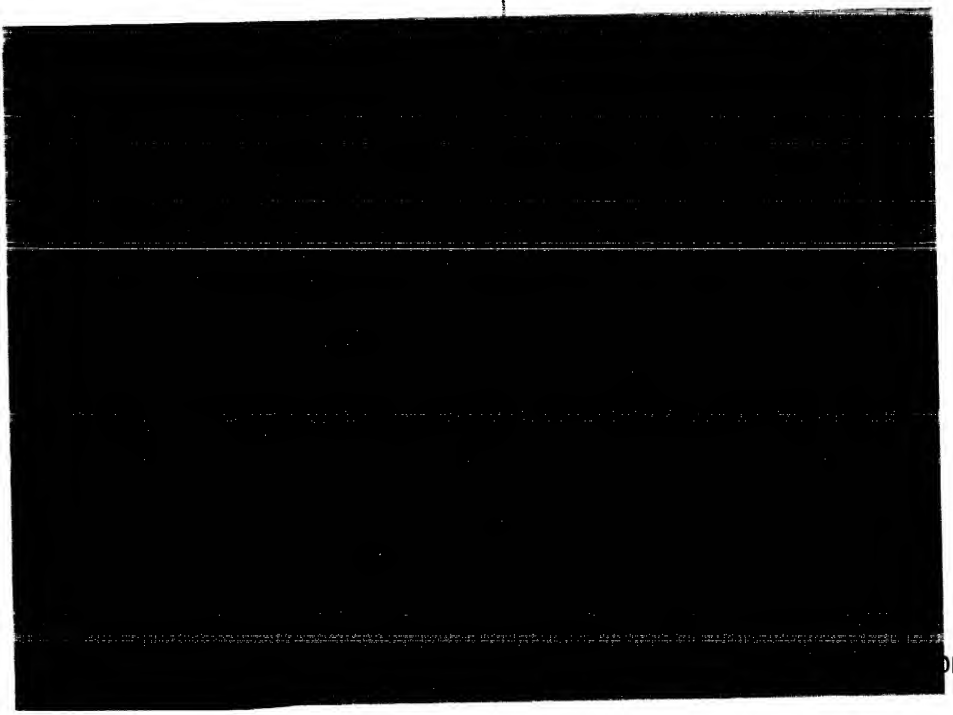
MANPOWER

The chief factor in manpower is *ability* . . . based on education, experience and inherent talents. This is especially true in the field of missiles and astronautics. Conventional military systems require collaboration of a selected group of engineers and scientists. In space systems . . . where technology is advancing beyond established scientific frontiers . . . special skills peculiar to this challenging area are required. Aerospace Division has been organized and staffed with top scientists possessing these abstract capabilities. Their experience has been obtained through actual participation in space studies and developments.

In addition to its key people, Aerospace has outstanding professional talents in its skilled personnel. Recruited from aircraft and missile sources, they are oriented into a coordinated team . . . dedicated to the conquest of space.







RELIABILITY

The keynote to success in tomorrow's complex space systems is reliability. It begins with the inception of the system idea. Design simplicity, Aeronca's constant objective, is a prime requisite because complexity multiplies the probability of failure. Environmental factors affecting a system in shipping, storage, installation, operation and maintenance also must be considered to establish sound design requirements. Exhaustive tests must be performed before delivery to further verify design reliability. After delivery, reports from field service men help to assure even greater reliability as production continues. This Aeronca philosophy and procedure assures customers of consistent and dependable performance.

QUALITY ASSURANCE

Quality Control is responsible for maintaining a continuous evaluation of all materials, tools, fabrication processes and assemblies as well as final acceptance of finished units. No effort is spared to assure the absolute accuracy inherent in military systems. All services or materials purchased from suppliers are checked by traveling inspectors. Items received by Aeronca are subjected to intensive tests to verify compliance with specifications. In addition, Aeronca's own fabrication and assembly operations are under constant surveillance. Gauges, test and other precision equipment are checked periodically for accuracy.

SECURITY

Because of the classified nature of military systems, Aeronca maintains a rigid and vigilant security program. All three divisions are completely fenced and guarded. All facilities are cleared to handle projects through Secret. Key Aeronca personnel are cleared through Top Secret.

DOCUMENTATION

Aeronca has considerable experience in the preparation of drawings, preliminary specifications, provisioning documents, reports and handbooks. Having engaged in military work since its inception, Aeronca is thoroughly familiar with military specifications and federal cataloging.

HISTORY OF AERONCA

Aeronca was the world's first lightplane manufacturer. Established in 1928, the company designed twelve different aircraft types and produced more than 12,000 private planes up to 1951.

During World War II, Aeronca put its entire capacity into the war effort and was the first lightplane firm to be awarded the coveted Army-Navy "E" for excellence in production. War programs included production of more than nine hundred L-3 "Grasshoppers", over nine hundred PT-13 and PT-23 trainers and the TG-5 training glider. In 1944, Aeronca became a major airframe supplier for the C-46, B-17 and SB-2C programs. In addition, the complete G-1 and G-2 Glide Bombs were designed and produced in this period.

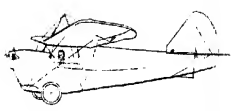
Aeronca also supported the Korean War effort by supplying more than six hundred L-16 aircraft.

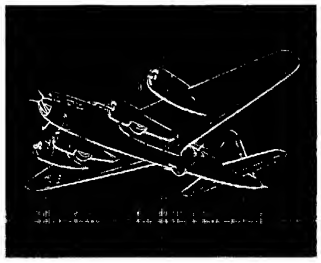
As a result of its extensive and diversified experience in aircraft design, engineering and fabrication, Aeronca has become a leading subcontractor of major airframe components and sub-systems for contemporary jet aircraft and missile systems. The transition from tube-and-fabric through conventional stressed skin construction to high-temperature structures fabricated from exotic materials has encompassed all phases of advanced aeronautical research, design, engineering and manufacturing.

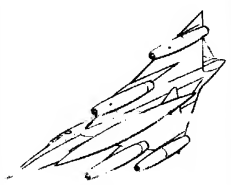
With fully integrated Design-Tool-Produce capabilities, Aeronca has paced . . . and advanced . . . state-of-the-art technology in sophisticated weapon systems concepts. In fact, Aeronca currently is the leading producer of complex brazed stainless steel honeycomb structures for supersonic air weapons.

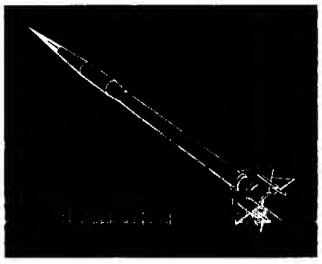
To meet the steadily growing demand for its versatile and specialized capabilities, Aeronca has expanded its facilities rapidly but soundly. An example of this planned expansion is the recent formation of the Aerospace Division. This new division, incorporating the original Aeronca research laboratory, is concerned with the management, research, design, development and fabrication of missile and space systems, sub-systems and components.

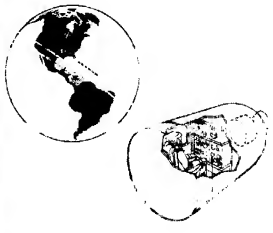
Today, Aeronca has three Divisions: MIDDLETOWN (Headquarters and main plants), AEROCAL (Torrance, Calif.) and AEROSPACE (Baltimore, Md.). Current facilities, long-range plans and the "Aeronca spirit" assure the company of a firm foundation for the future.

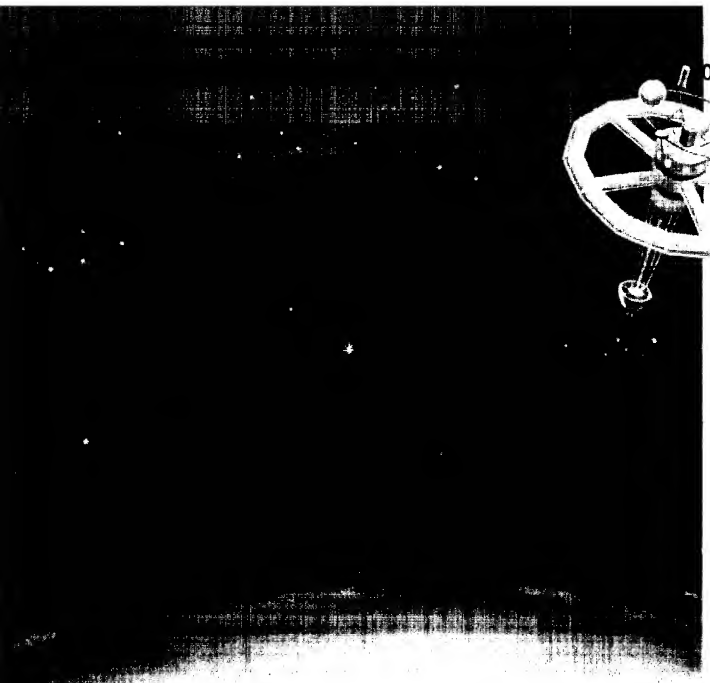


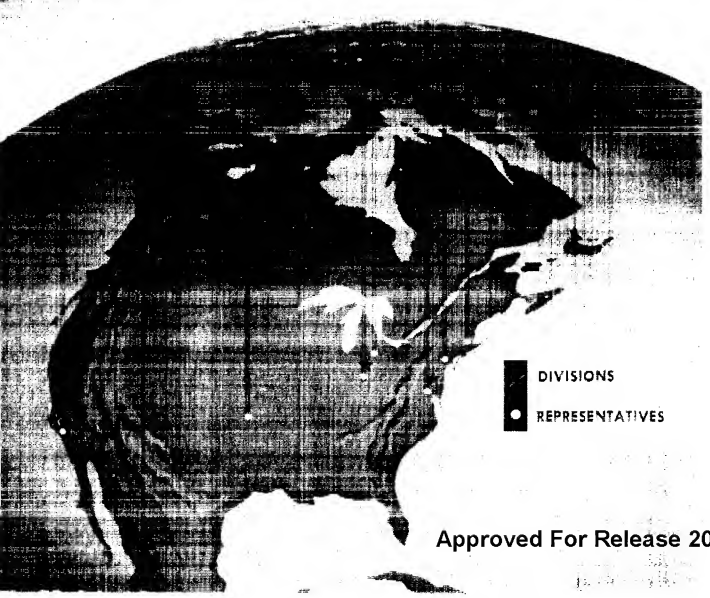












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SPACE STRATEGY

DECEMBER 22, 1959

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SPACE STRATEGY

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SPACE STRATEGY

A basic question faced by military planners today can be phrased as follows: Is the United States justified in going into space? If so, what strategic advantages does space present from the military standpoint? What are the basic space missions and what are their "Modus Operandi"?

In order to answer these questions properly, one should briefly glance back to the origin and roots of the military establishment and of military strategy.

What is the proper role of the military in a nation's life? This role depends upon the structure of the particular society being considered.

Looking back into history, we find that from the early dawn of pre-history to approximately 10,000-7,000 BC, human economy was based on food gathering. Man was basically a "hunter and gatherer" of the products of vegetation. We find even at that early date that man was a social animal, banding together in groups; most of the individuals of the group engaged in the business of gathering food which left very little time for other occupations. These groups ruled themselves apparently by a form of natural democracy, with Chiefs elected primarily for their qualities of physical or mental powers for the safeguard of the group. The total population of the globe was apparently very small; it is estimated that approximately 200 to 400 people inhabited the British Isles about 15,000 years ago, with similar densities holding throughout the remainder of the inhabited world.

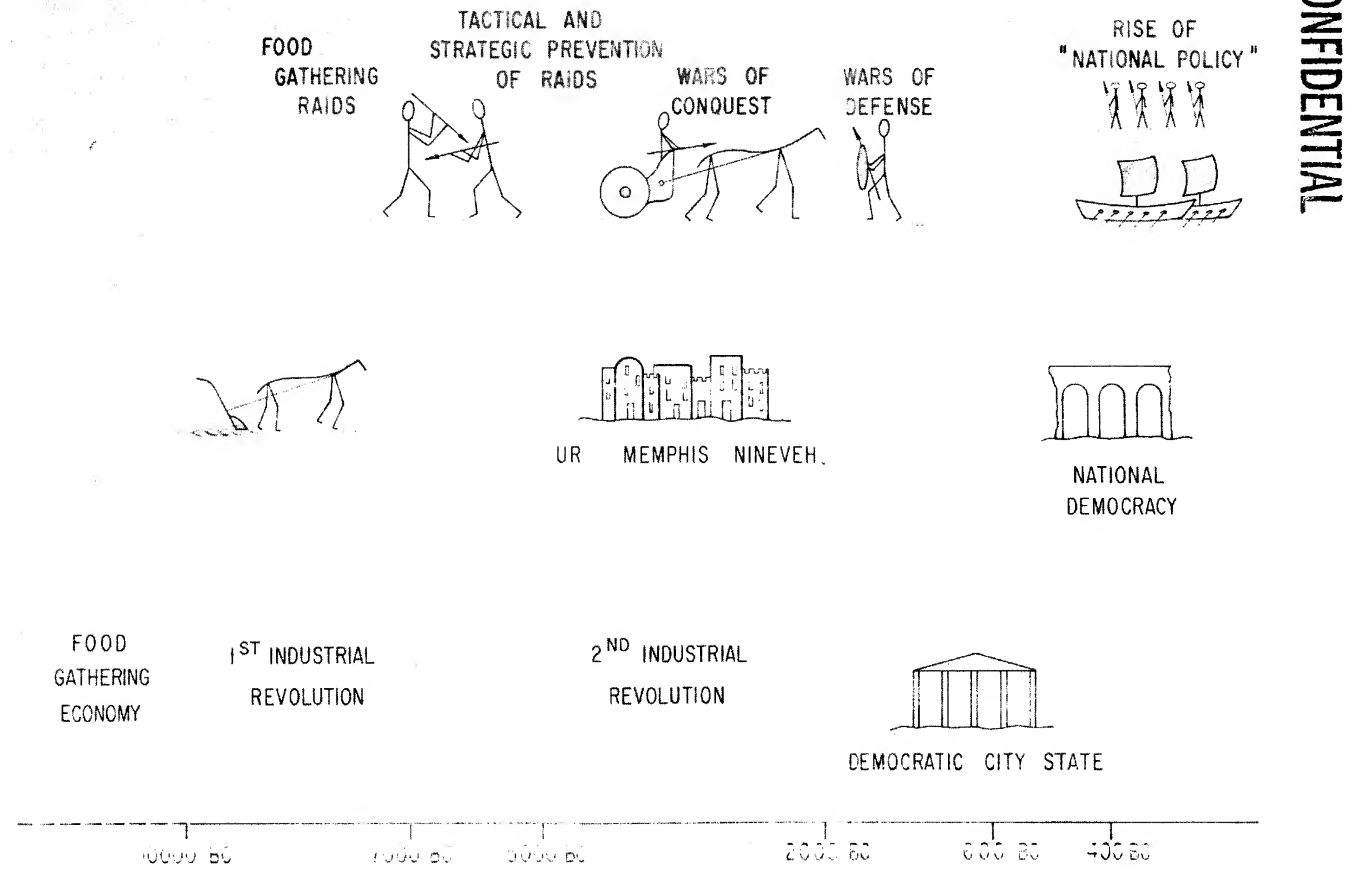


Figure 2 - Evolution of Military Policy in the Ancient World

Historians hold that human society at that time was basically peaceful except for occasional clashes over hunting grounds; there was, therefore, no military organization as such. From approximately 10,000-7,000BC, a phenomenon occurred which historians call the "First Industrial Revolution": certain food-gathering tribes discovered that food could be produced more efficiently by planned cultivation instead of haphazard gathering and by herding of domesticated animals rather than by hunting. This period witnesses the rise of the agricultural and pastoral structure of society. The phenomenon did not develop all at once, nor did it occur simultaneously throughout the inhabited area of the world. It originated first in the Nile Valley and in the Middle Eastern "fertile crescent" and spread slowly to neighboring areas. The "invention" of cultivation and shepherding increased the efficiency of food production so that each person of the group was able to produce more than he could consume; this led to the freeing of a portion of the group's members for other pursuits. This is the real significance of the "revolution"; namely, the fact that man was not completely bound any longer by the sole task of producing food, but acquired some idle time which enabled him to think about other problems. The groups that adopted the newfound "invention" became rapidly wealthier than the surrounding groups.

It developed, though, that certain of these surrounding groups discovered that it was profitable to raid the wealthy agricultural and shepherding groups and acquire the fruits of their labor by a temporary expenditure of force. We witness here the first rise of a para-military organization, whose task was primarily "military

food gathering". The raided groups had no choice but to defend themselves, and created in turn a warrior or military organization to prevent (tactical defense) and punish the raiders (preventive retaliatory, or strategic defense). Since the agricultural and pastoral groups were over-producing, they were in a position to free a number of their members for such military defensive enterprises. Also, they discovered that in these retaliatory operations they could capture members of the enemy group and use them profitably as labor force. In turn, this freed more of the members of the original group for other occupations, so that the pastoral and shepherding groups tended to grow in wealth.

As a consequence of these military operations, the agricultural groups discovered that it was desirable to conduct military operations from strongholds in which a number of warriors were concentrated. In turn, these warriors had to be supported with food, weapons, and other services, so that the stronghold sttracted a variety of other supporting individuals. We witness at this time, the beginning of what historians call the "Second Industrial Revolution"; the "invention" of urbanization.

People soon discovered the advantages of banding together in cities; more and more specialization of industries and trades developed, with better tools being generated, not only for warfare, but also for food production. Thus, less of the population became concerned with the mere task of producing food, while the remainder specialized in other tasks. The rise of the cities brought the necessity for a much closer and direct supervision and, thus, central government emerges, either led by a single individual or

by groups of the most powerful and wealthiest citizens. We witness during this period the gradual rise of the concept of State vested in the ruler. The military become fully specialized as an instrument of power for the state which meant essentially power for the ruler or rulers. The military also develop the task of police power, to prevent other members of the State from plotting against the ruler or seizing power themselves. During this period, the military are thus the arm of the ruler for acquisition to himself of more absolute power and for the defense of the ruler's possessions against neighboring rulers with the same objectives.

Approximately 600 BC, we witness the rise of another phenomenon; the democratic City States of Greece. The almost miraculous Greek concept considers all citizens as equal voting units, with conformance to the laws of the state as a self-imposed discipline in the interest of common welfare. Every major decision in the Greek city state was taken by the citizenry as a whole with thousands of votes cast and counted.

This presented a giant step forward in governmental techniques, but was obviously not practical beyond the scale of a city state. Sometime later, about the fourth century BC, we witness the rise of national democracy in the Roman State, in which the citizens did not vote on every issue, but confined their elective powers to the naming of representatives appointed for fixed periods of time. Here for the first time, we see the beginning of the modern concept of democracy; namely, rule by the will of the majority, delegated through elected representatives. In the Roman state we witness the rise in

a modern sense, of the concept of "foreign policy"; the military become the implementors by force of the State's foreign policy. In the Roman concept, the military are subject to civilian power at all times and are used in conjunction with other branches of the state, such as civil representatives (our diplomatic service).

After the fall of Rome and during the dark ages, society falls back to a more primitive state in which power is fractioned among numerous local rulers and military forces return to the ancient role of implementing the power of each ruler.

With the Renaissance and the rise of Commercialism (the Trading Republics, the Hanseatic League), we witness the gradual formation of national States with emphasis on trade. The foreign policy of these groups extends to the protection of sea lanes, of commerce, and the fostering of commercial competition. The military acquire a new connotation, in the Trading States, as the arm of trade; commercial competition by force. In other national entities, they are still the arm of whatever foreign policy that State elected to pursue. This state of affairs lasts until the industrial revolution of the early 19th century, which some historians call the "Third Industrial Revolution". Prior to the third revolution the basic economic fact was the constancy of production per capita typical of artisanship. Thus the "economic good" was control over as many producing units as possible, which was equivalent to control over as many people as possible. The control could be either commercial or political, with political control generally following The basic goods were land and peasants (the agricultural producing

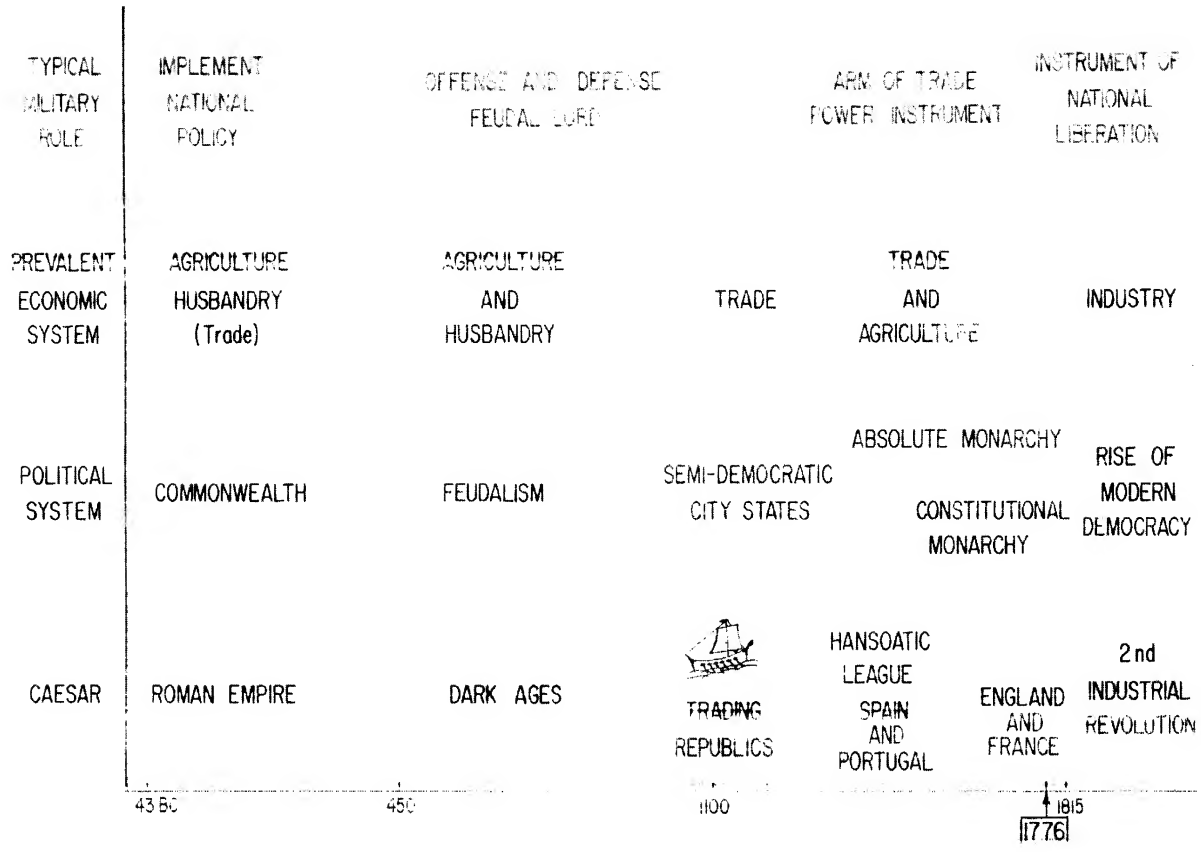


Figure 3 - Evolution of Military Role to the 3rd Industrial Revolution

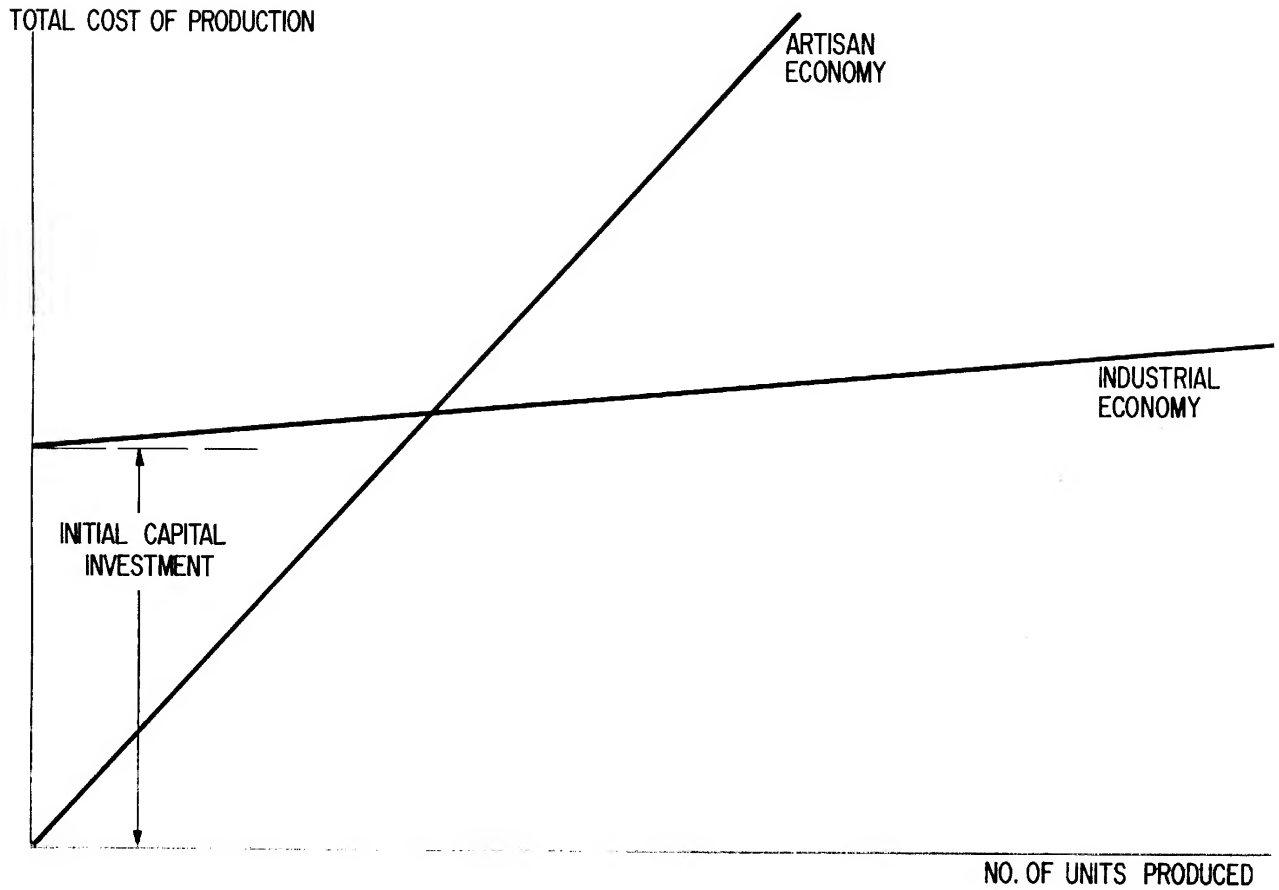
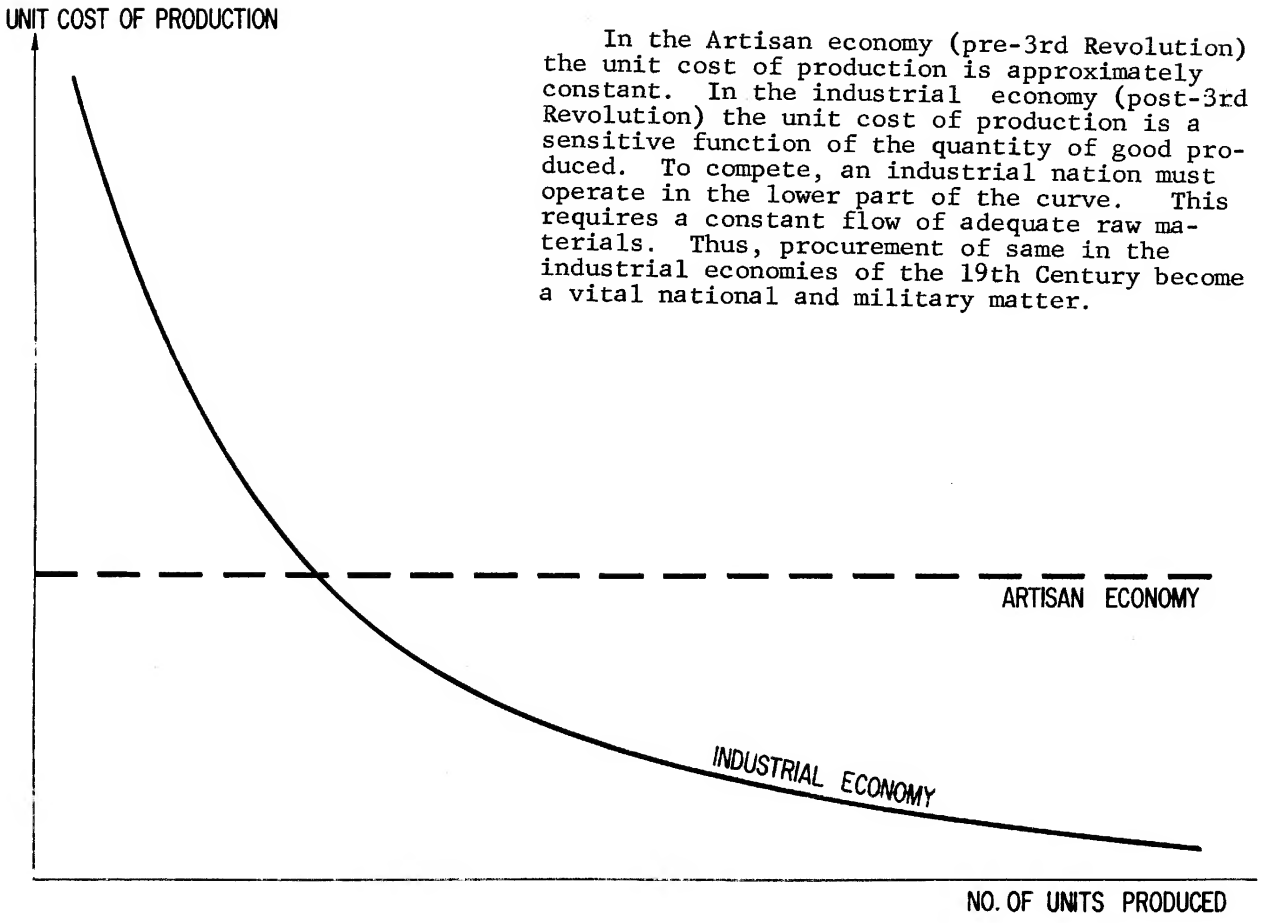


Figure 4 - Basic Factors of the Economy Before & After the 3rd Revolution



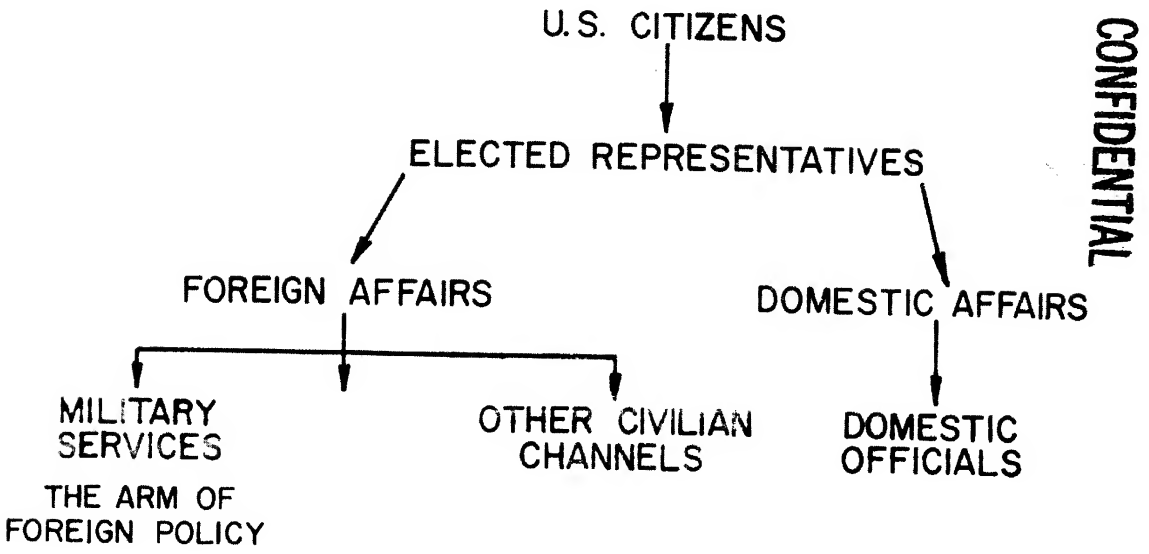
In the Artisan economy (pre-3rd Revolution) the unit cost of production is approximately constant. In the industrial economy (post-3rd Revolution) the unit cost of production is a sensitive function of the quantity of good produced. To compete, an industrial nation must operate in the lower part of the curve. This requires a constant flow of adequate raw materials. Thus, procurement of same in the industrial economies of the 19th Century become a vital national and military matter.

Figure 5 - Basic Economic Factors

units), cities and artisans (the industrial producing units), sea lanes and concessions in foreign commercial ports (commercial producing units).

With the Third Industrial Revolution, there occurs a basic economic change. Man learns to produce more and more with the help of mechanical power, in quantities vastly beyond the individual's need. Under these circumstances, a national nucleus could in theory live completely self-sufficiently if all necessary raw materials were to be found within its borders. Thus, land "per se" as an agricultural producing unit becomes less important; the economic goal becomes the accession of capital equipment, skilled workers, and raw materials. The military, as an instrument of foreign policy, acquire during this period (19th century and first half of 20th century), a further connotation aimed at procuring raw materials or securing their possession. This is the typical pattern of the 19th century British Empire, of German expansion, etc.

In evolution and motivation, the United States stands unique since it originated "ab novo" at the dawn of the Third Revolution, and was thus free from earlier traditions of conquest by force for pure power or commercial needs. It rapidly acquired territory vast enough to hold practically all of the required raw materials. It took advantages of the industrial revolution to the highest degree, and rapidly evolved to a self-supporting and self-sufficient national entity with extremely high standards of living. Although the United States started with a military operation, and was characterized by military operations during its early life, it soon



THE STATE

Figure 6 - Structure of the State in the U. S.

discovered it had little to gain by further territorial expansion beyond its borders for the following reasons:

(a) Wars of conquest would merely take over national groups of lesser standards of living, which would constitute a drain on the national economy rather than an advantage.

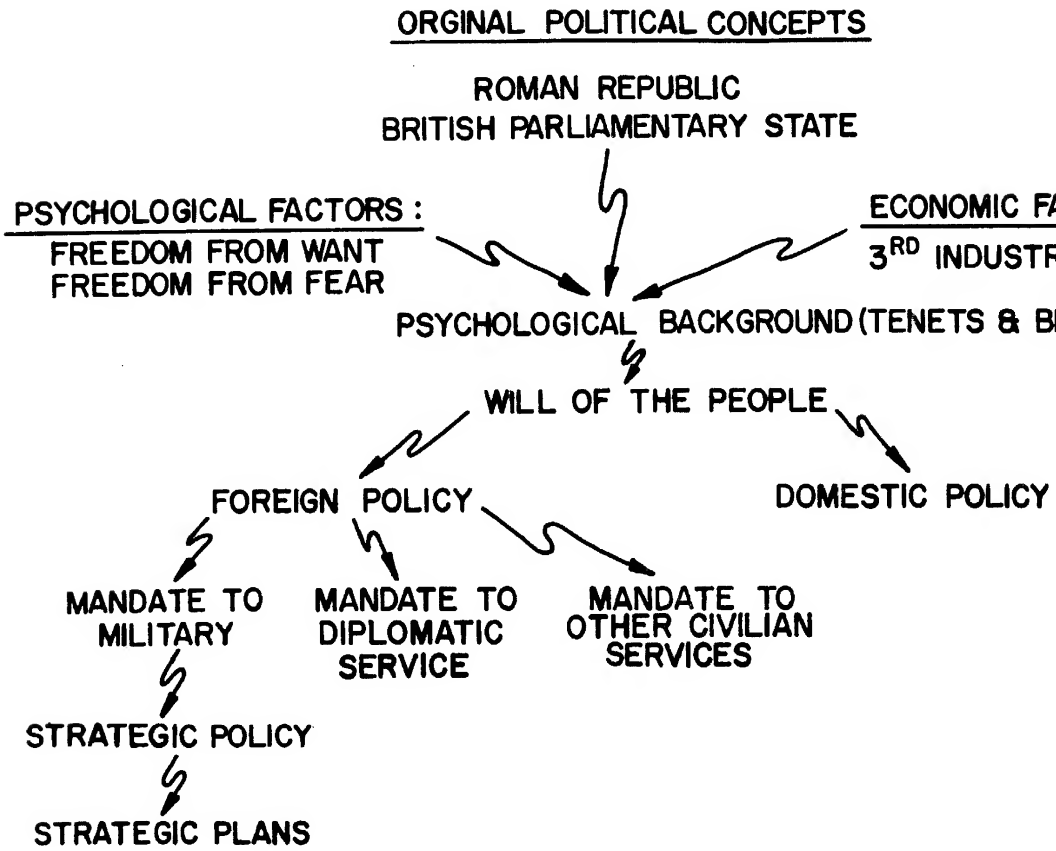
(b) The U. S. possessed most raw materials; therefore, there was little incentive to seek others outside its borders.

(c) The U. S. had sufficient economic power from its internal sources to purchase those few raw materials needed, and felt confident of victory in the case of active opposition to such purchases.

(d) Its geographic position and national aims did not interfere with the aims and goals of other major powers. Thus, the U. S. was able to live without interference and felt confident of an assured commerce with other nations of the world.

The United States, having borrowed the majority of its political concepts from the most successful democracy of ancient times - the Roman Republic - having refined them with the experience of the most successful commercial democracy in the world - the British Empire - and having gleaned to the fullest extent the benefits of the Third Industrial Revolution, experienced a particularly trouble-free and fortunate youth. This happy experience thus formed and conditioned U. S. national concepts and impregnated the policy of U. S. national life.

In the U. S. concept, the State is an instrument of the people. The "will of the people" is thus the main spring and root of all activities of the State. The will of the people is embodied in



PSYCHOLOGICAL FORCES IN THE STATE

Figure 7

the duly elected representatives, whose job it is to give concrete body and aim to a foreign policy reflecting the character of the nation.

Within this framework, the basic mandate to the military is to implement by force the national foreign policy. The military must thus shape a "Strategic Policy" to enable them to carry out the mandate.

The military are thus the arm of the people in implementing by force (actual or potential) a foreign policy which is the concrete embodiment of the "will of the people".

It should be noted that the foreign policy is not immutable, since the will of the people can change as a natural response or adjustment to outside pressures. The military must, therefore, be prepared to change their strategic policy. For instance, one of the principal U. S. tenets today is "The United States will never start a war".

This may conceivably change at some time in the future if adherence to this policy should court excessive risk of national destruction.

It should also be noted that the Strategic Policy is invariant with the state of hostilities, since it represents basic aims which do not change except by a major change in the military's mandate from the people.

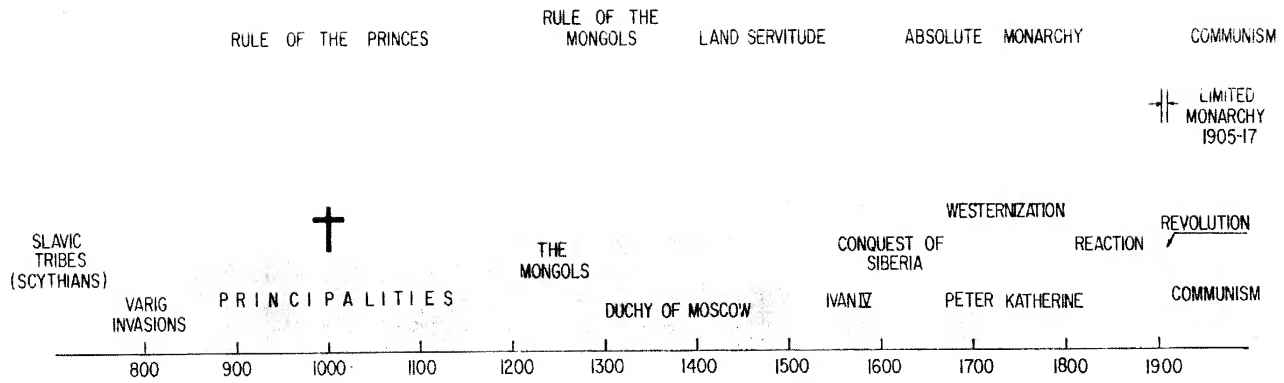
Today the United States faces the greatest challenge of its history, and with it, all the civilized world. This challenge is presented by an alien philosophy backed substantially by the

resources of a group of 200 million people. It is important at this point to analyze the U.S.S.R. desires and motivations, and the resulting U.S.S.R. foreign policy and strategic policy.

First, there is not in the Soviet Union a "will of the people" manifesting itself in appointed representatives. There exists rather the will of a minority which tends to direct the psyche of the population, either by persuasion or by force, along lines of its own Correspondingly, there is a relatively sharp distinction between the "will of the people" and the "will of the government" with the latter tending to mold popular thinking rather than follow the people's desires.

This cleavage represents one of the most interesting possibilities from a long range military standpoint. It is important to analyze briefly the psychological make-up of the Soviet people before discussing the aims and policies of their government.

The origin of the modern Soviet Union begins in the 9th Century AD. The land which is now European Russia was settled by primitive Slavic tribes (the "Scythians" of the Greeks and Romans) living under a form of natural democracy. In the 9th Century, invasions from the northern Varigs, a people closely akin to the Normans, gave the land its first rulers. The "Land of Rus" became divided into a number of principalities with rather frequent shifts of owners and of territories. Christianity began to appear approximately 1000 AD. Economically, a mixture of primitive food gathering, mainly hunting, operated side-by-side with rather primitive agriculture and with trade for which the large rivers provided



PROFILE OF RUSSIAN HISTORY

Figure 8

excellent channels. In the 13th Century the Mongols invaded the land, spreading to the shores of the Adriatic and then withdrawing into the Transuraian region. According to Mongol policy, they left two concentric zones around the territory in which they settled: an outer ring of burned land and an inner ring of tributary people. The region of European Russia found itself in the second ring and became thus tributary of the Mongols, while still retaining their vassal princes.

Although the Mongols, in general, treated their vassals mildly and brought considerable civilization to the region, a strong popular movement grew up agains them. It is during these two centuries of Mongol domination that the concept of a National Russia slowly rose.

During that time, a heretofore obscure city grew steadily into prominence by the skillful management of its leaders. Moscow, strategically located near a center of river trade, gradually acquired the connotation of Mother City of Russia. Its rulers became more or less the head of the liberation movement against the Mongols which were finally driven out from all of European Russia at the beginning of the 15th Century. The principality of Moscow continued to grow under skilled commercial management until in the middle of the 16th Century Ivan IV was crowned Czar of Moscow. During his reign the Russian land workers were by edict bound to the land and became "servants of the land". The reign of Ivan IV is followed by incessant internal troubles between the depressed people and the lords and between the lords and the czars. It is peculiar of the Slavic

mind, however, that the numerous popular revolts were never aimed against the concept of absolute rule itself, but rather against the existing corrupt government. It was as though the people accepted absolute rule as a necessity: this is still a fundamental trait of the Soviet psychology.

In the beginning of the 17th Century, the conquest of Siberia began. This conquest was basically peaceful: it has many resemblances to the American conquest of the West. Waves of dissatisfield people swept eastward toward new land, closely followed by others which constantly penetrated beyond each of the previous new lines of settlement. It is interesting to note that these Russian people driving East in discontent with their home conditions still remained loyal to the Muscovite czar and claimed all their conquests in his name: no attempt was made to set up independent states. In fact, new settlers were followed closely by Government bureaus which claimed the land officially for the Czar.

All of Siberia was practically Russian by the middle of the 17th Century, a fantastically rapid advance. This interesting combination of immense energy with obedience to authority is still a typical trait of Soviet psychology.

At the beginning of the 18th Century, Peter the Great started the Westernization of Russia which was later continued by Katherine. This period witnessed the beginning of Russia as a modern military power and the chains of servitude became stronger around the peasants.

After the Napoleonic Wars, during which a glimmer of the hope of freedom filtered down to the Russian masses, a period of violent governmental reaction set in. The 19th and early 20th Centuries are punctuated by a violent class struggle between the government and the nobility on one side and the masses of the people on the other. This state of affairs ended in 1917 with the Bolshevist Revolution. Since then, and except for a brief initial period of hope, the patient Russian people have been subjected to a yoke in effect heavier than that of the Czars with, however, one basic difference: people were now working - or at least were told so - for their own improvement rather than for that of a distant class of noblemen. The yoke considerably lightened since the death of Stalin, and psychology is now being strongly manipulated to make Communism appears as a national goal worthy of all efforts.

In conclusion, the Soviet people are an immensely energetic and hard working group, at the same time a malleable group taught by tradition and upbringing to respect authority almost without question. History has shown that psychological forces at work in the Soviet people are quite slow to operate, but after they gather sufficient momentum explode with great violence. All in all, the Soviet people form an ideal nation of raw material for their Communistic rulers.

Let us now briefly examine the motivations and policies of the Communist leaders of the Soviet Union.

Modern communism derives its basic tenets from the works of Marx, Engels, and their followers. Marx believed in the unavoidable existence of class rivalries caused by the economic problem of distribution of wealth. These rivalries inevitably would result in a clash between

capital and labor which would, in turn, inevitably lead to civil war with the ultimate inevitable result of socialization of each state and finally of socialization of the entire world.

The foundations of this philosophy and belief still form the essence of the communistic state, although notable changes in the method have been effected since the time of Marx. Lenin, the great expounder of Communism after Marx and the creator of the Russian state, modified the Marxian intransigance by adding that: "Marxist goals can and need be obtained by borrowing certain methods (notably management) from the capitalist bourgeoisie". Furthermore, after some period of practical experience with the Bolshevik state, Lenin realized that a transition period had to be gone through before final Communism was reached. Thus, the efforts of the Communistic state were aimed at initial "socialization" before final "Communization".

Stalin contributed in concrete form the policy that communist goals must be achieved by psychological warfare as the prelude to the "inevitable" armed struggle.

From a study of Communistic literature, statements, and actions, it is quite clear that the ultimate goal of the Communist leaders is the communization of the entire world. Because the leaders are Russian, this mystical and quasi-religious goal is variegated with elements of Russian Nationalism and colored with the age-old Russian yearning for expansion. Thus, a more accurate phrasing of the Communistic goal is the following:

Communization of the world under the leadership of Moscow.

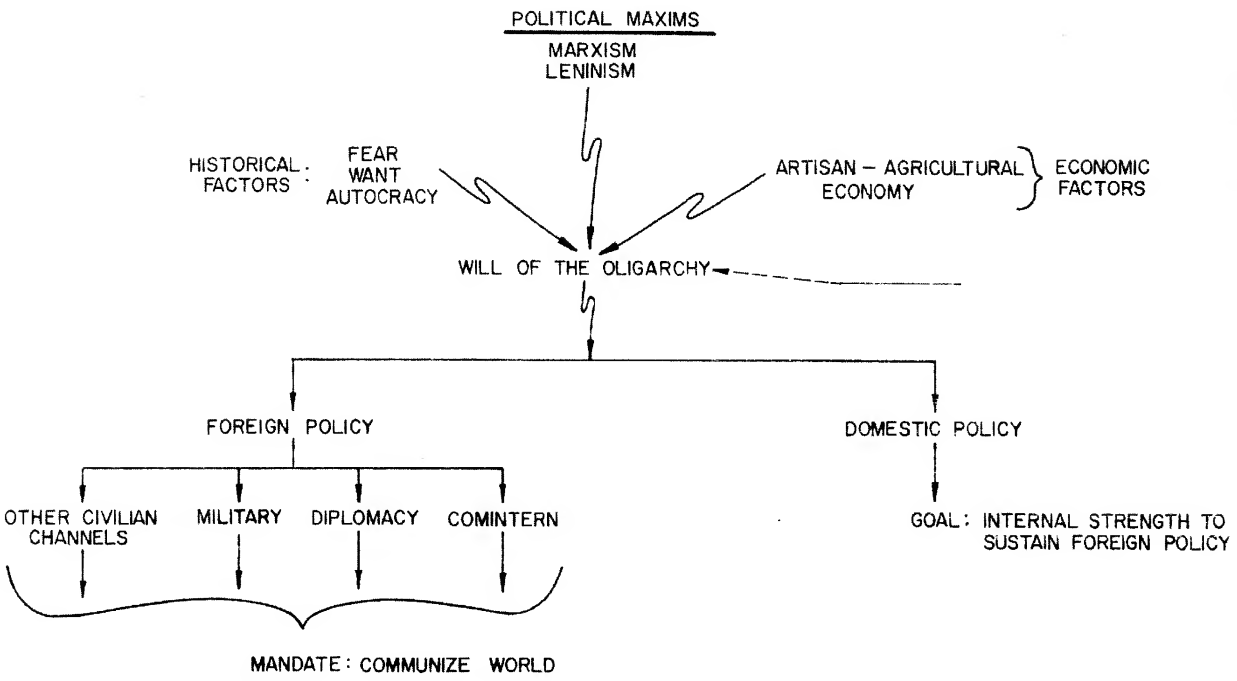


Figure 9

Russian foreign policy can thus be simply stated:

Communization of the world under the leadership of Moscow by using any possible means within the disposal of the Soviet state: military, diplomatic, political, propaganda, technological.

The role of the military in Russia is to serve as the strong arm of foreign policy. The strategic policy is thus one of strength and preparedness for the two-fold purpose of armed attack wherever a weak spot is presented, and defense of the homeland against nuclear zation.

Russia constitutes at present the principal if not the only focal point for our foreign policy. Towards Russia, we have a policy of containment of Communism, which constitutes the key and main objective of all our efforts.

This is a relatively novel situation: the rivalry with Russia is not caused by a struggle for markets, or by territorial disputes but is principally an ideological struggle. As such, it must be safeguarded, and as such it must be fought.

In light of the foregoing, the basic mandate to the U. S. military is: Contain Communism.

Specifically, the mandate is: Contain communism by avoiding war. If war is necessary, win it. Protect the allies and the uncommitted. If possible, rebut communism.

While the military must operate in furtherance of these goals in conjunction and in harmony with the other services of the State, on them devolves the heaviest task: assuring that the state is militarily strong. Without this basic prerequisite, all efforts of the civilian branches are futile.

In order to fulfill their mandate, the military have at their disposal several means or strategies, some of which they control fully, while in others they can play a powerful fostering role.

Let us examine these means. They are:

Classical military strategy

Psychological strategy

Technological strategy

Economic warfare.

A. Classical Military Strategy

By classical military strategy, we will define those methods and means which involve the physical use of military force. This use of force is, of course, not restricted to active war, but operates in potency during peace as well.

To the mandate of the civilian authorities discussed above the military respond with a Strategic Policy which lays down the basic ground rules for implementing the mandate. As of now, the U. S. strategic policy can be summarized as follows:

- Create and maintain a strong deterrent force.
- Create and maintain a strong capability for retaliatory offense.
- Strong defense of the homeland.
- Defense of allies and uncommitted nations.

It should be said in passing that this is a typical passive defense policy. Historically, this type of policy has always proved deletarious since it leaves the strategic initiative to the adversary. While the basic mandate prohibits initiative in offensive military operations, since this is repugant to the electorate as a

U.S. FOREIGN POLICY: CONTAINMENT OF COMMUNISM

MANDATE TO MILITARY: CONTAIN COMMUNISM
BY AVOIDING WAR

IF WAR NECESSARY, BY WINNING IT ——

IF POSSIBLE, REBUT COMMUNISM ——

Figure 10

U.S. STRATEGIC POLICY:

1- STRONG CAPABILITY TO OFFEND (DETERRENT)

2-STRONG DEFENSE OF THE HOMELAND

3-DEFENSE OF ALLIES

4-PREVENT COMMUNIZATION OF THE UNCOMMITTED

Figure 11

STRATEGIC POLICY INSTRUMENTS

A - CLASSICAL MILITARY STRATEGY

B - PSYCHOLOGICAL STRATEGY

C - TECHNOLOGICAL STRATEGY

D - ECONOMIC WARFARE

Figure 12

whole, the military must consider in their plans a policy of active defense. As will be shown, this policy can best be implemented within the basic mandate by aggressive psychological and technological warfare.

The strategic policy is implemented by a Strategic Plan which constitutes the concrete embodiment of the basic policy principles. The plan is formulated, taking into account our resources, both monetary and manpower, enemy resources, and geographic facts. Thus, the strategic plan is apt to change from time to time; as a matter of fact, flexibility is one of its prime virtues.

We have discussed enemy intents and resources as well as own resources. This leaves the area of geography.

The geographic area affected by the strategic plan, area which thus can become a potential battlefield, constitutes the "Theater of Operations". The "Theater" thus is not only the area where battle or war is actually waged, but any area in which war can potentially be waged.

Figure 13 shows the U. S. Theater of Operations from inception to the present. This area has in somewhat less than two centuries expanded to cover the entire planet. Strategically, the two dimensional theater has been exhausted (although tactically there is still room for expansion) - thus any further expansion, if needed, must of necessity occur in the third dimension. The question is: is it advantageous to go into the third dimension and why?

We do not here make a question of "space vs atmosphere" nor of the technological difficulties imposed by the space medium.

U.S. THEATER OF OPERATIONS
1776 - 1960

Figure 13

The fact that above a certain altitude the atmosphere ceases and that the motion of bodies, therefore, must obey different laws, is a secondary consideration: if expansion into the third dimension should prove strategically desirable, the technological means to overcome natural difficulties must be explored and be found.

To properly answer the question, let us first lay down a self-evident ground rule; to wit: Operations in the third dimension (space) are only useful <u>if they affect the power balance on earth</u>. This ground rule can be expected to hold fast and true at least until 1980. After this period, and assuming space developments will proceed at the expected pace, a different era begins to dawn: the era of planetary settlement. In this era, if certain conditions should be satisfied we can anticipate a gradual growth of planetary colonies with eventual possible commercial rivalries. This situation would open up the possibility of military operations in space not directly aimed at affecting the power balance on planet earth.

Figure 14 shows a recapitulation of the fundamental Principles of War, as formulated for twenty-four centuries by the great strategists from Sun Tsu to Clausewitz.

The Dual Column in the figure indicates the principal action to be taken to foil the enemy's application of the Principles.

Among the various military operations of strategic and tactical importance there are four which clearly would benefit from a three-dimensional expansion. These are:

STRATEGIC PRINCIPLES

DIRECT	DUAL
MAINTAIN INITIATIVE	
CONCENTRATION OF POWER	DISPERSE FORCES
ECONOMY OF FORCE	" "
SURPRISE	EARLY WARNING
MOBILITY	TIE-DOWN
SECURITY	RECONNAISSANCE
CONTROL OF OWN FORCES	DENY COMMUNICATIONS

Figure 14

- Strategic and tactical reconnaissance
- Communications
- Own location (navigational)
- Defensive early warning and identification.

The benefits accrued by the third dimension stem directly from geometric factors of shape and size of the earth as well as from the current status of interceptor technology. All these are too well known to warrant a detailed explanation here The principal point to be made is that we are not here concerned with the technological difficulties of performing these functions: we are primarily concerned with whether going into the third dimension yields substantial advantages. Second, we are concerned with whether the contemplated operations are reasonably feasible within present or future state-of-the-art and within the resources of the nation.

Reconnaissance from a satellite has the very obvious advantage that it can cover a large area thus affording more potential information than lower altitude reconnaissance: further, it is vulnerable not so much because of the difficulty of destroying a satellite, but more importantly because of the present psychology of the cold war. That satellite reconnaissance is theoretically feasible can be quickly shown by Figure 16 which shows the aperture diameters required to resolve a one meter target from an altitude of 300 kilometers. It can be seen that this degree of resolution is optically achievable, although obviously a number of problems lie in the path. At this point, a military planner would ask the question: "How much is this reconnaissance worth and how much will it cost?". This

EARLY MILITARY OPERATIONS FROM SPACE

- RECONNAISSANCE
  - WEATHER
  - SURFACE ACTIVITY
    - TACTICAL
    - STRATEGIC
- OWN LOCATION
  - TACTICAL
  - NAVIGATION
- COMMUNICATIONS
  - TACTICAL
  - STRATEGIC
- EARLY WARNING & IDENTIFICATION (DEFENSIVE)

Figure 15

assessment of costs forms the next step of the investigation and is, therefore, not discussed here, although the question should be answered at least within a range of values in order to justify the mission thoroughly.

It is true that any satellite-based system immediately raises questions of vunerability, jammability, etc. The answer to these questions is broadly two-fold:

- First, all these systems are useful, not only during active conflict, but first and foremost during state-of-readiness conditions. Thus, the question of vunerability is only of partial importance.

- Second, these basic missions apply to practically all weapons systems and it is the role of the designer to minimize adverse affects by proper choice of parameters. The airplane, for instance, is a particularly vulnerable machine, yet a number of technological improvements have been and are being applied to reduce its vulnerability. In spite of a relatively high degree of vulnerability, no one would question the usefulness of the airplane as a military instrument.

A second group of operations is the delivery of the weapon, generally considered the classical ultimate purpose of military operations. With respect to weapon delivery operations, use of the third dimension is only useful if:

a. It permits the employment of weapons peculiar to the space conditions and environments and effective against earth.

b. It permits particularly useful and effective means of weapons delivery.

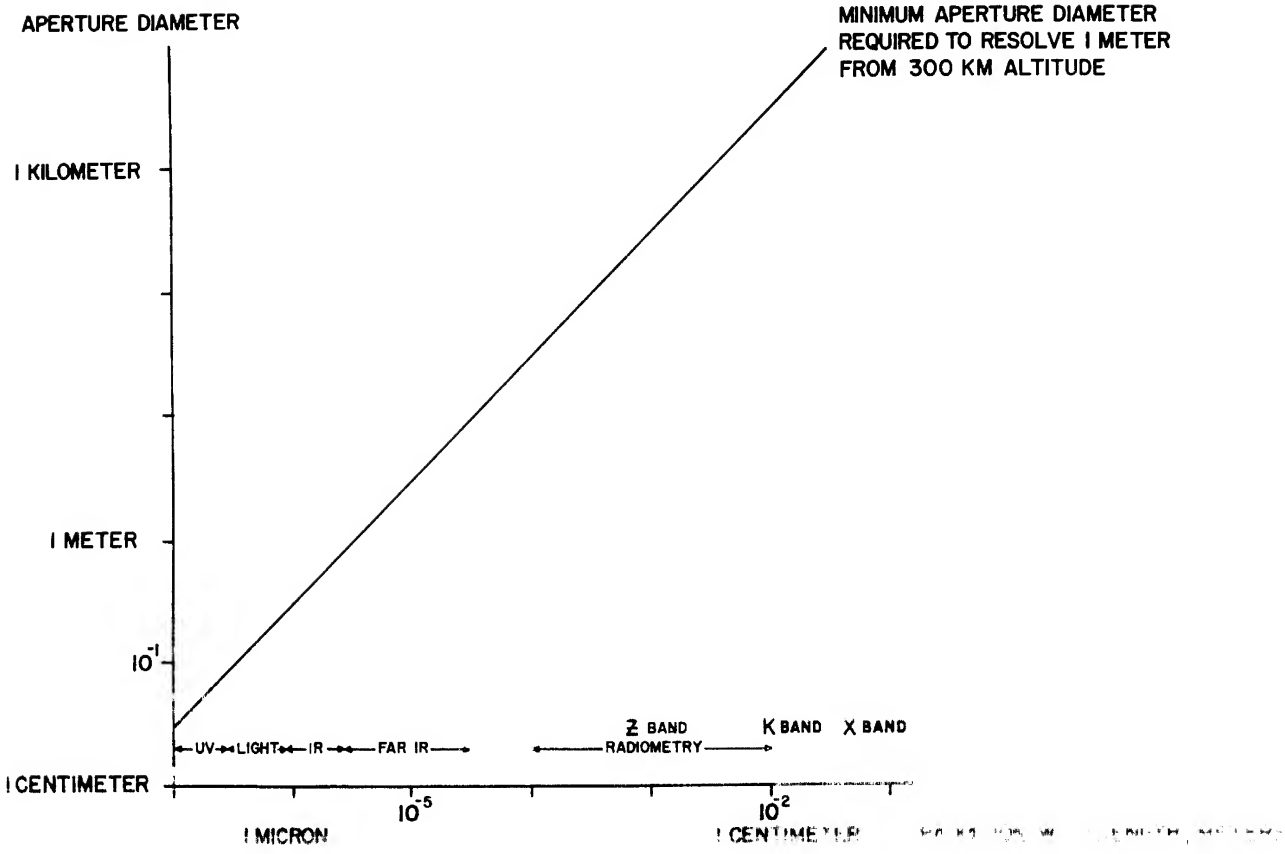


Figure 16

There exist a number of possibilities for weapons which satisfy a. Principal among these are:

- The solar mirror
- Weather control from space
- Selective elimination of the ozonosphere
- Use of directed meteorites

In addition, for direct use in space against other space operations are the categories of focused particle weapons.

Some of the principal characteristics of one of the above "pure space weapons" are depicted in the following figure.

Basically, however, these are weapons still to be developed which require a substantial overall technological capability. It can be predicted that at least for several years to come the nuclear weapons will constitute the primary, if not the only, type of practical weapon. Since this weapon can equally well be delivered by air breathing means or by the already developed ICBM, it does not obviously fall under Category a. Let us, therefore, examine whether delivery from space has any advantages.

First of all, we can observe that the ICBM will be fully operational, in the sense of instant response, by approximately 1963-1965. This date can be expected to hold for both power groups. Without an effective counter weapon (AICBM), the fully operational ICBM is truly very close to the "ultimate weapon". We are all familiar with the various studies conducted on the effect of massive nuclear attack upon the U.S. or the U.S.S.R., and their dramatization in the current periodical literature. It is quite obvious that use

PURE SPACE WEAPONS

SOLAR MIRROR

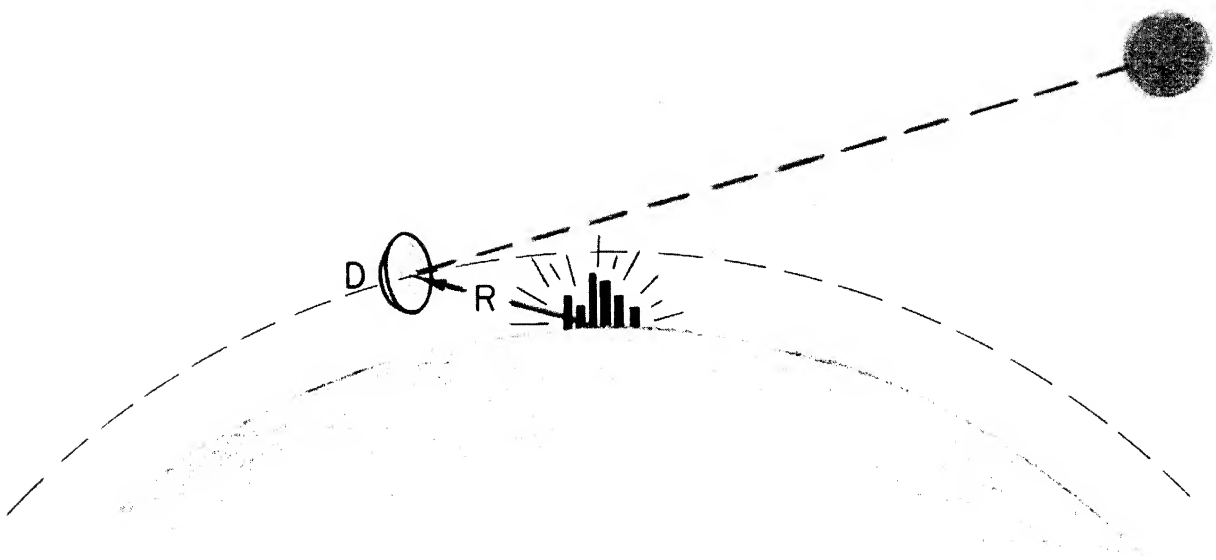
WEATHER CONTROL FROM SPACE

SELECTIVE ELIMINATION OF THE OZONOSPHERE

DIRECTED METEORITES

FOCUSED PARTICLES

Figure 17



IN THE ILLUMINATED AREA THE SUN'S FLUX IS INCREASED BY: $\left(100\,\frac{D}{R}\right)^2$

WEIGHT: $\approx$ 10 TO 30 $\frac{\text{TONS}}{\text{Km DIA.}}$

THE SOLAR MIRROR

Figure 18

of the ICBM by one group without an effective counter weapon would invite massive retaliation by the other group with the ultimate result of a mutual national suicide. Thus, use of the ICBM by either the U.S. or the U.S.S.R. against each other would simply result in the reduction of both powers from their present position of world preeminence to the status of third rate nations.

The ICBM is thus an "ultima ratio" weapon to be used as a deterrent only. A situation of this nature obviously leads to a stalemate as far as decisive military operations are concerned, while not absolutely prohibiting military operations of a secondary nature conducted with conventional weapons. Above all, the situation is particularly conducive to psychological and economic warfare in an attempt to resolve the stalemate by "bloodless penetration".

To resolve this stalemate, one of the contenders must achieve an effective AICBM defense system. Since the other cannot allow this to happen, both can be expected to engage in the development of such a defensive system. Barring breakthroughs in the state-of-the-art, any AICBM system will, of necessity, operate on the principle of bullet-hit-bullet or bullet-against-gun and will thus rely on two primary technological areas:

a. The spotting function (early warning, identification, detection, and tracking).

b. The intercept function.

The interceptor vehicle, again barring a breakthrough, must attain the same order of magnitude of velocity as the offending vehicle. Furthermore, the spotting complex must have adequate

time to perform its functions. It is obvious, then, that the entire defensive system is speed-sensitive. (On the other hand, a "screen" placed at a fixed altitude above the defended area and capable of volatizing offending objects would not be speed-sensitive. Such a "screen", widely discussed in early AICBM work, does not appear in any way close to practical or even conceptual realization.)

For fixed detection radius, the warning time increases inversely with the terminal speed of the offensive warhead. A reduction in warning time imposes more severe restrictions upon the defense system since:

a. The probability of multiple passes against a target decreases.

b. The speed of the countermissile must be proportionately greater not only to meet the speed of the attacker, but also to compensate for the shorter reaction time since the distance at which the offending warhead must be destroyed is fixed. (To prevent damage to the defended area.)

c. Thus, for fixed detection distance the size of the AICBM increases exponentially with the speed of the ICBM.

A mitigation of the exponential law can only be achieved by increasing the detection range of the system. In the case of active detection, this imposes a fourth power penalty upon the active detection system.

Generally, then, one can conclude that the effect upon a bullet-hit-bullet defensive system of increasing terminal speed is the following:

a. A fourth power increase in capability for the detection system plus an exponential increase for the intercept system, or

b. Zero for the detection system and more-than-exponential for the intercept system.

Figure 19 shows the approximate relationship of defensive system capability vs terminal speed of attacking warhead.

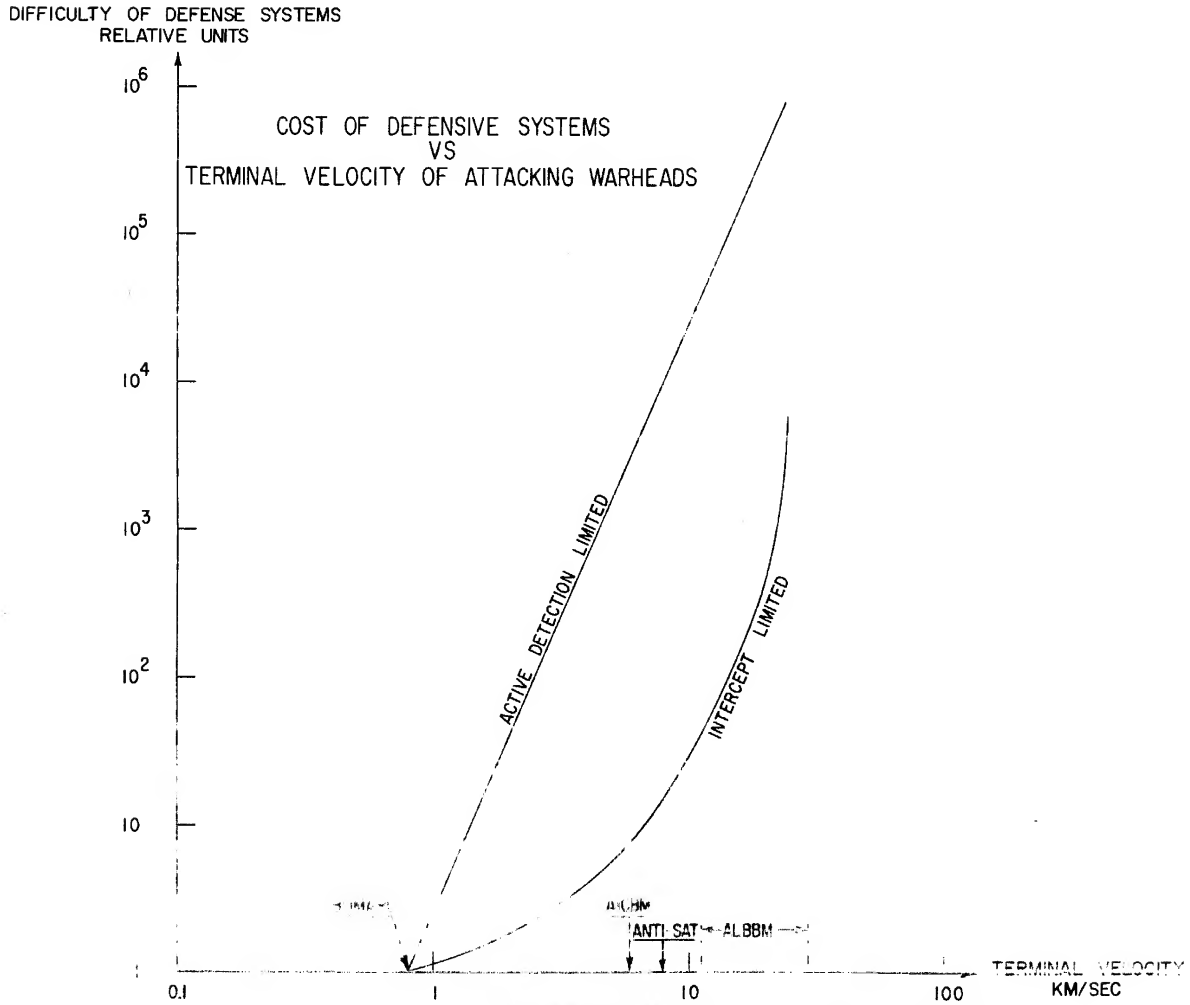
The logical development of the ultimate weapon is thus

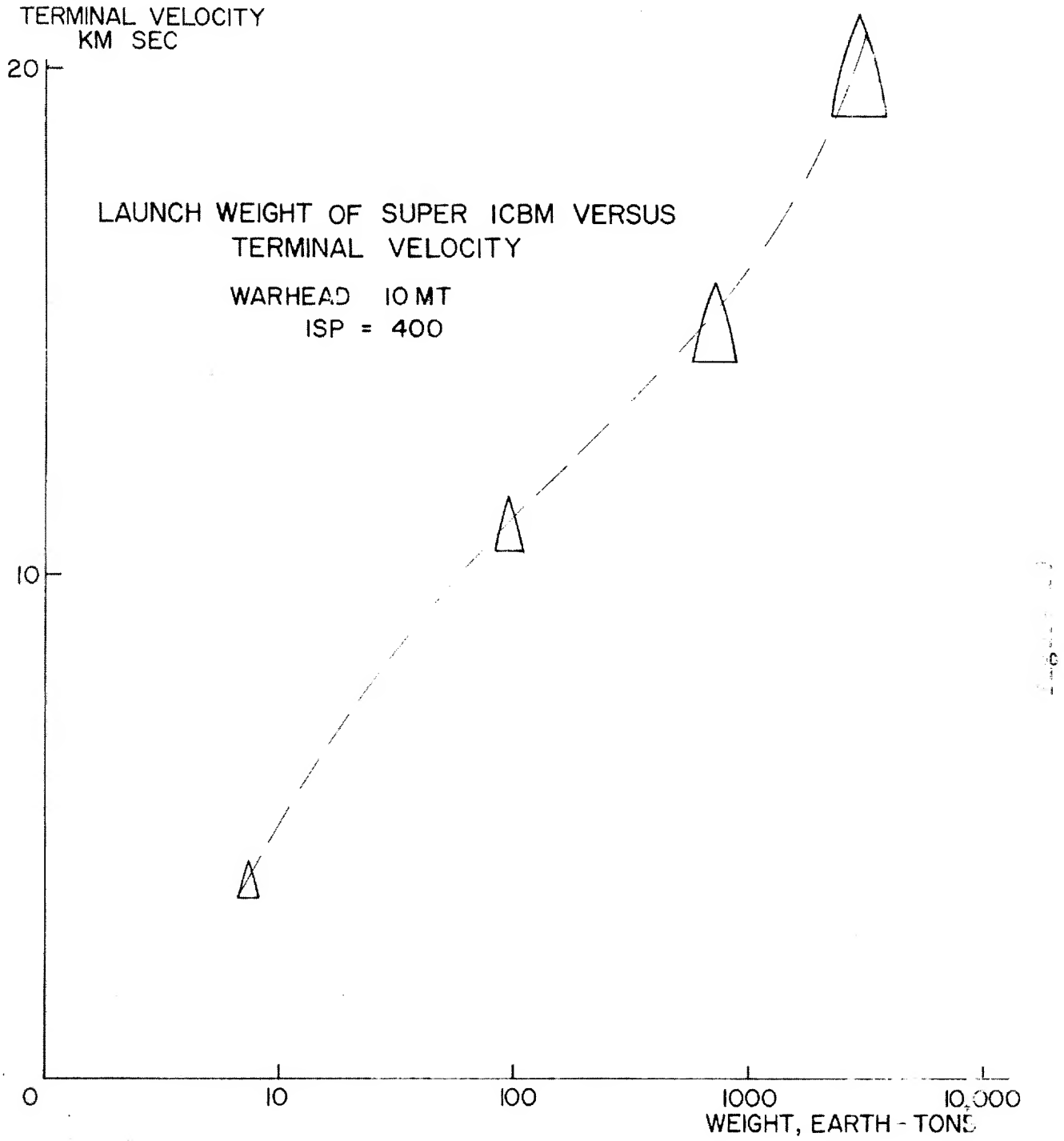
ICBM - AICBM - Super ICBM

How is such a high-speed vehicle best brought about? The present-day ICBM system relies on the principle of conservation of energy: the initial speed imparted by the booster substantially equals the terminal speed. It is obvious that with the purely ballistic concept, terminal speeds of roughly 6 kilometers per second cannot be exceeded. Any excess speed above this figure requires midcourse or terminal boost and thus increases the size of the missile.

Figure 20 indicates the weight of such a high speed ICBM as a function of terminal velocity.

For earth-launched ICBMs, another possibility consists in a near vertical shot at near escape velocity; by the principle of conservation of energy the terminal speed of the re-entering missile will approximately equal the initial speed. By this method, speeds of approximately 11 kilometers per second can be achieved with greatly increased reaction time and with greatly increased weight. The disadvantage of earth-firing is that the gravitational field is conservative; thus, we can only get back as much energy as we have put into the system.





To satisfy the principle of economy of force we must seek particular conditions or phenomena which allow us to operate with "leverage".

One such obvious set of conditions is the operation from an earth-orbiting space station.

It is obvious that a missile previously stored within the space station can be made to impact earth with but a negligible expenditure of fuel. The terminal velocity will depend on the station's orbit: for near orbits, terminal velocities of roughly 8 kilometers per second, and for far orbits of up to 11 kilometers per second can be expected. The difficulty of this system is that all the materials composing the station and the weapons themselves have to be lifted from earth onto the station itself: thus, what one gains in potential energy is exactly matched by an equal expenditure in kinetic energy from earth with no net advantage over the super-ICBM system. To truly obtain an advantage, we should visualize a space station capable of generating, without burden upon earth, its own offensive system.

Fortunately, such a base is available in the earth-satellite, moon. Energy-wise, the moon is in a particularly fortunate situation since it lies at the fringes of the earth's gravitational field and has thus high potential energy further the moon appears to possess practically all the raw materials required to create a self-sufficient weapons sytem.

Bombardment from moon to earth can be performed in a number of ways, with, however, two limiting cases:

a. The maximum terminal velocity maneuver which also yields maximum reaction time.

b. The minimum reaction time maneuver, which also yields minimum terminal velocity.

It should be noted that maximum and minimum here are relative to the total velocity reserve of the rocket employed. Figure 21 indicates the terminal velocities achievable as a function of total reserve velocity of the Lunar Based Ballistic Missile. Figure 22 shows the weight in earth-tons of the Lunar Based Ballistic Missile required to achieve specified terminal velocities.

We remark here that the construction of a base on the moon capable of generating its own military materials <u>including rocket structures and rocket fuels</u>, will successfully break the postulated ICBM-AICBM stalemate because it will nullify the AICBM system developed against an earth-launched ICBM. However, the LBBM is <u>worthwhile if</u>, and only <u>if</u>, a <u>successful AICBM system is developed</u>. Should this not be the case, the LBBM is a <u>redundant system</u> in that it merely increases the threat without offering any effective defensive capabilities.

Figure 23 shows the reaction time of an LBBM used against earth. These long reaction times serve only to emphasize the concept of the LBBM as an ultimate weapon of <u>strategic destruction</u>

It should be noted that the LBBM, more than the ICBM, possesses the <u>capability of recall</u>. Figure 24 indicates a typical LBBM minimum energy maneuver in which the LBBM is initially aimed at circling the earth and returning to moon orbit. At point A (an

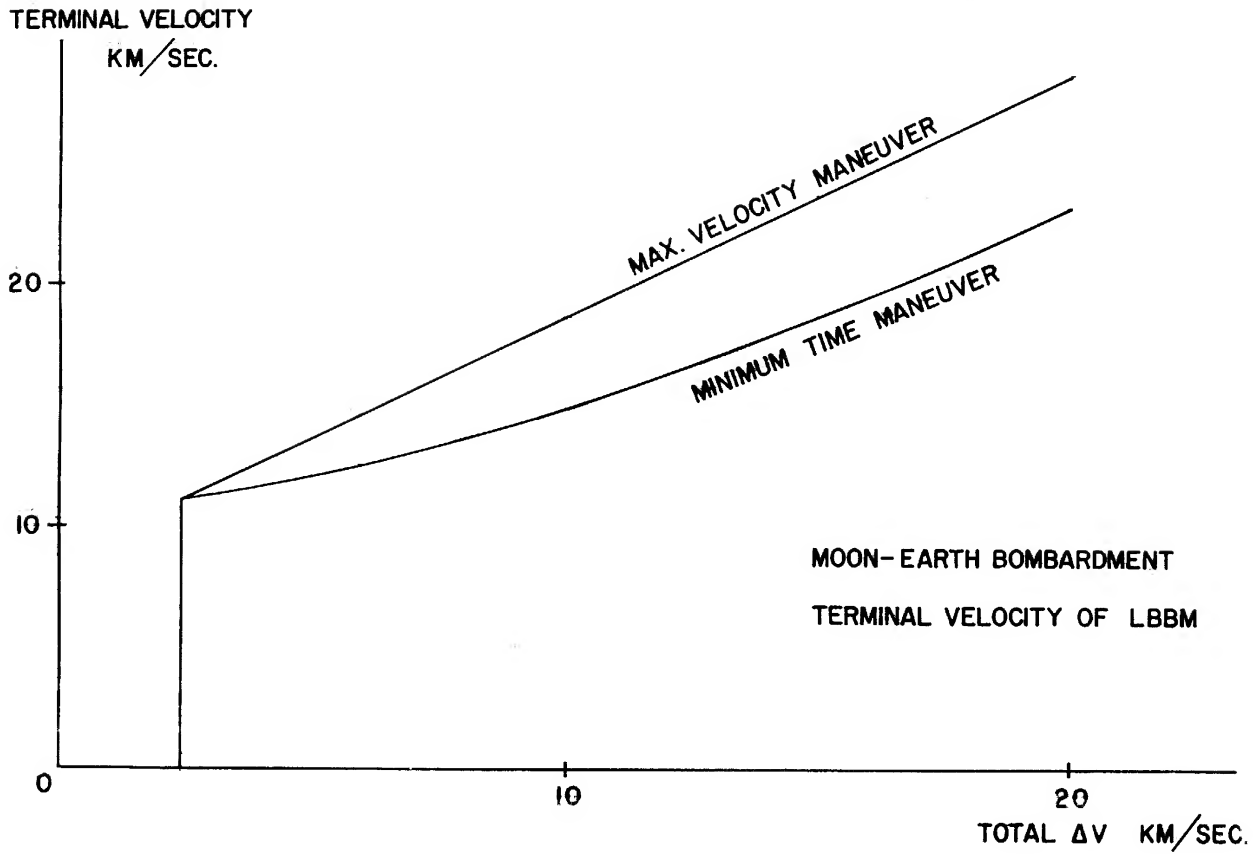


Figure 21

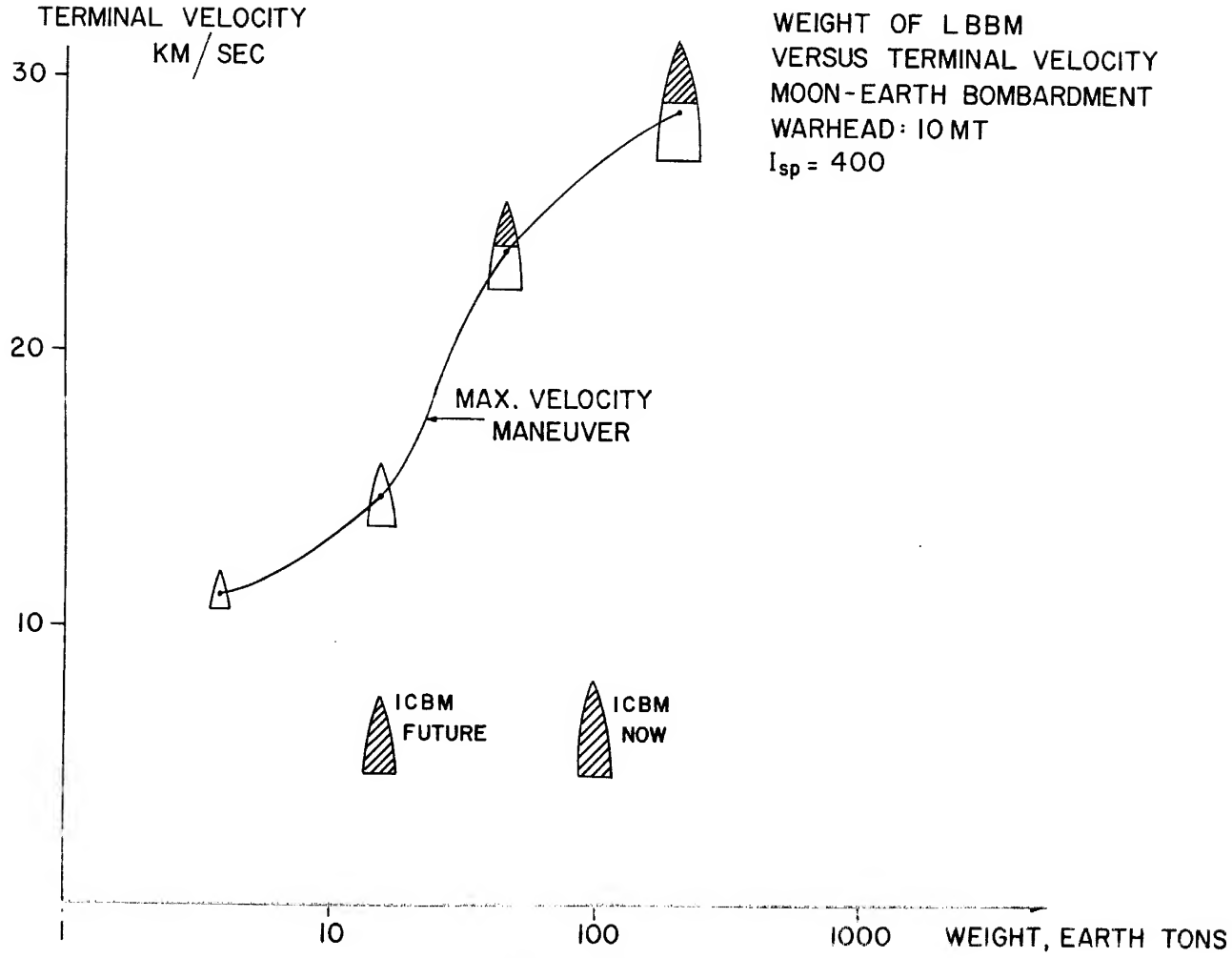


Figure 22

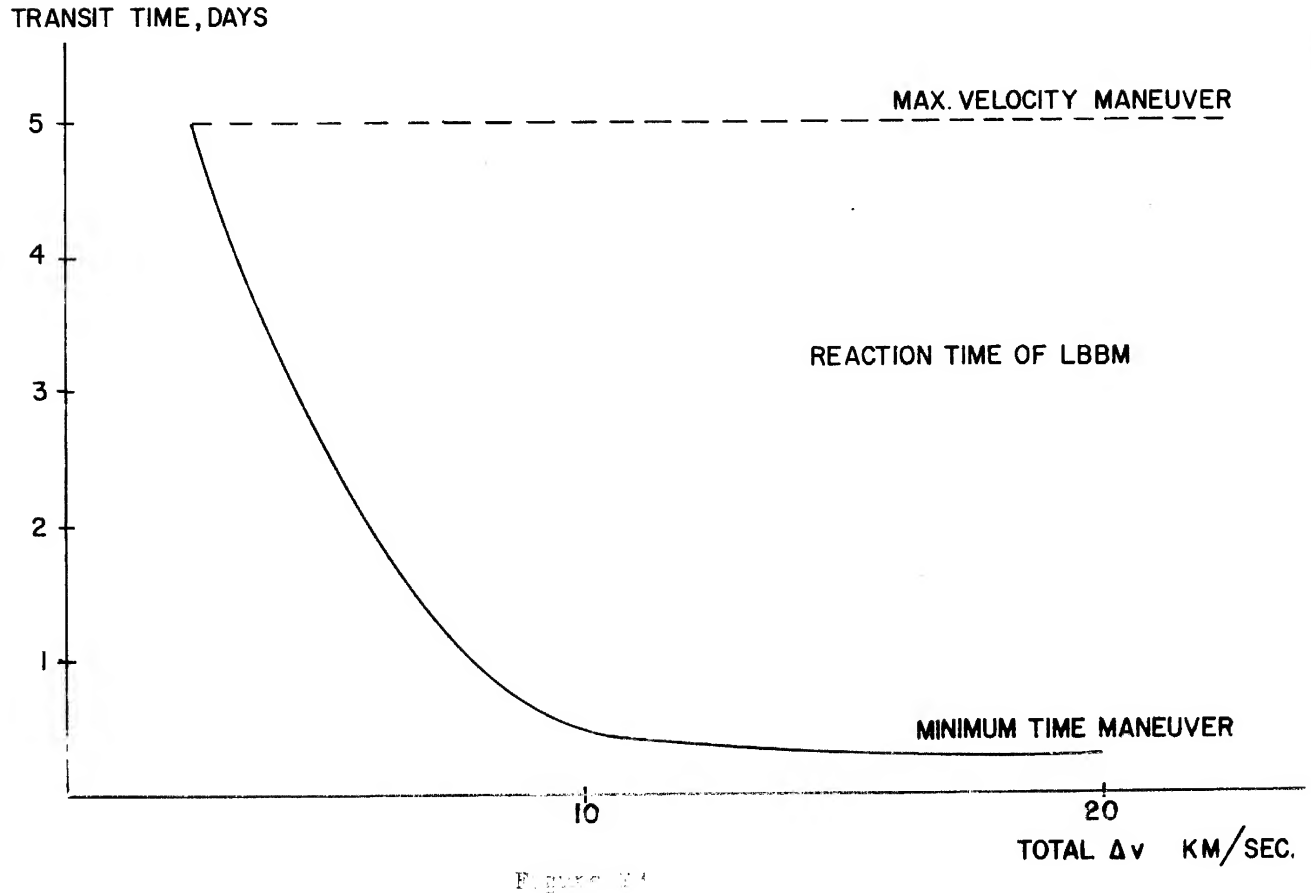
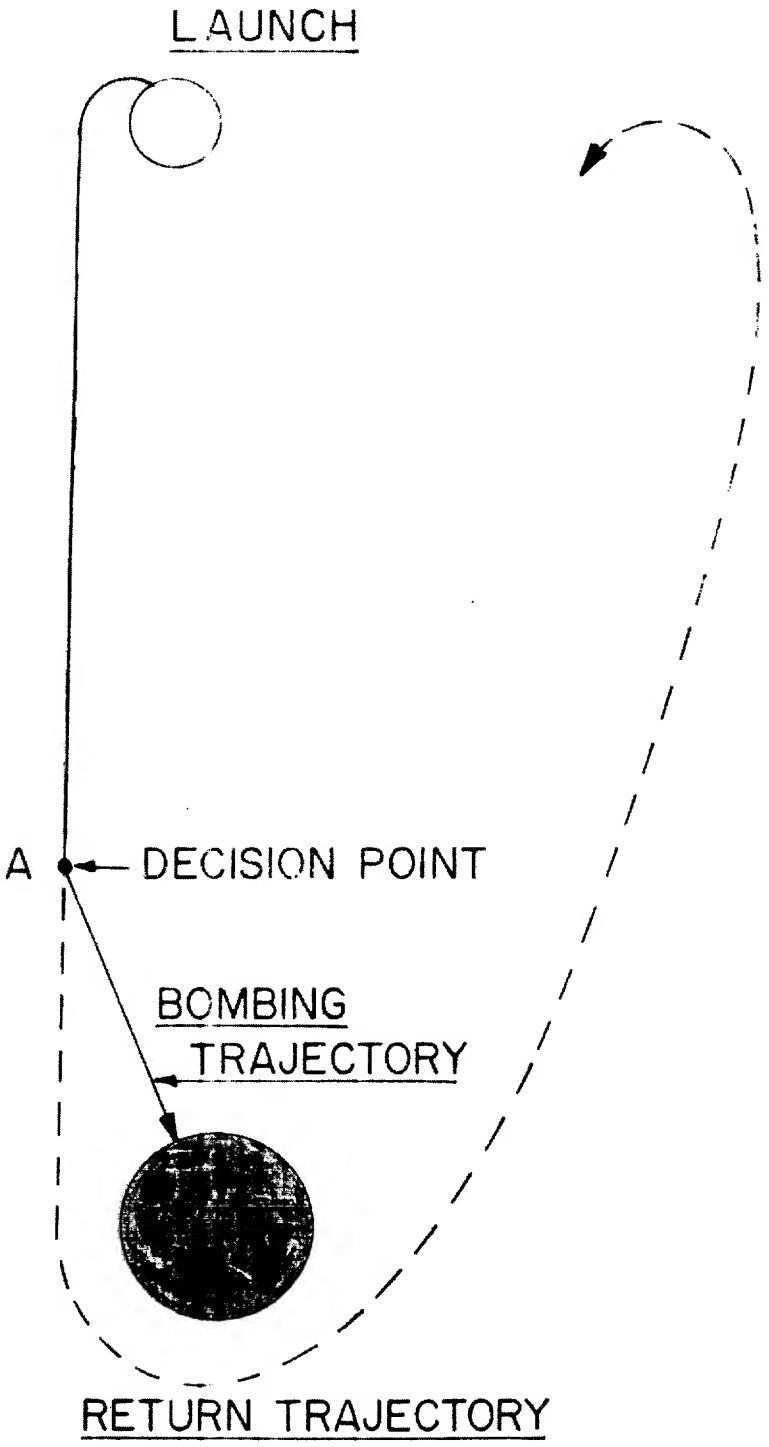


Figure 24



RECALL CAPABILITY OF LBBM

Figure 24

appreciable time after launching), the path can be corrected to a direct bombardment maneuver. Thus, launching LBBMs in the minimum energy mode will create the added psychological bonus of several days of threat time upon the adversary.

Moon base thus satisfies a number of the basic strategic principles: its construction would definitely allow the U. S. to maintain the initiative by leap-frogging the slow development of the AICBM and gaining an assurance for the future. It certainly satisfies the principle of economy of force in that a small missile crew could from moon base, control the world. It satisfies the concept of mobility by the possibility of recall. It satisfies the principle of surprise because the LBBM can be launched from the dark side where rocket exhausts are invisible, and can be coated because of vacuum conditions with radiation-absorbing materials. The last burst of speed in the maximum velocity maneuver need only occur at the very last phase before impact. The enemy is thus forced to detect and track a microscopically small target launched at an unknown time in an undetectable manner. The principle of security is illustrated by Figure 25, which indicates the weight of earch-launched missiles vs terminal impact speed on the moon. It can be seen that the earth-launched anti-lunar missile (ALM) is enormously larger than the LBBM itself. Add to this fact that an underground lunar base can be made practically invunerable in a tactical and strategic sense, since the destruction of the surrounding territory will have little or no effect upon the economy of the base itself. Thus, bombardment of the moon is costly and likely to prove sterile in strategic results.

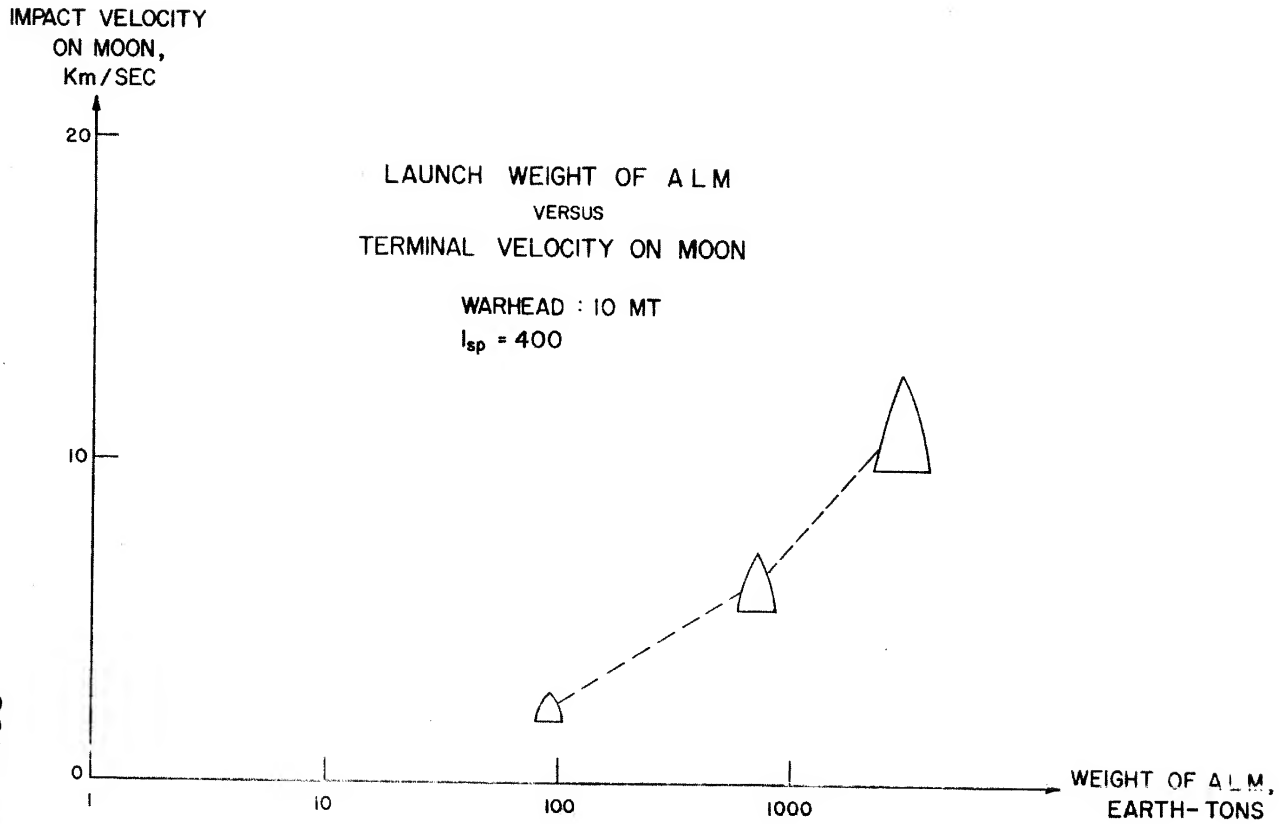


Figure 25

The importance of moon base is thus obvious: in our possession, it insures against successful development of AICBM by the U.S.S.R. On the other hand, in Soviet hands, it would be tantamount to saying that our development of the AICBM is futile.

The preceding analysis basically assumes a forthcoming ICBM-AICBM stalemate, with space-based retaliation weapons as a decisive factor.

Let us conduct this analysis one step further. If the lunar based offensive complex constitutes the decisive factor in the struggle, then destruction of such a complex would determine the outcome of the conflict. It can be safely assumed that both the U.S. and the U.S.S.R. will construct such a lunar complex.

The obvious implication is that intra-lunar war may well be the decisive factor which will affect the entire balance and the future history of earth.

If one of the contending parties successfully manages to destroy the other's lunar base, it will then merely have to issue an ultimatum to its earth rival to bend it to its will, as in the case of the U.S.S.R., or to insure peace, as in the case of the U.S. There exists thus, the possibility of shifting the theater of operations entirely from earth to space and to the moon in particular, with possibly the preservation of the human race as the ultimate result.

We conclude then, that space presents some very definite classical strategic advantages. Some are immediate, such as reconnaissance, communications, navigation and early warning - some still lie in the future, such as the LBBM. It is obvious from the preceding

analysis that the U.S. has reasons of its own to go into space, quite independently from U.S.S.R. action. In fact, a strict countermanding of every Soviet move may well play us into their hands by making us victims of their strategic plan.

B. Psychological Strategy

The psychological element has always been considered a fundamental determinant of military operations by the great strategists of the past. Suffice it here to mention the Italian campaign of Hannibal. This great general, with barely 40,000 soldiers under his command, could not possible hope to defeat the Roman coalition of 750,000 soldiers by mere force of arms. His plan relied instead upon separating the allies from the Roman "hard core" by a show of strength and of military prowess, thus influencing them psychologically rather than by mere force.

A well conducted psychological offensive is the most desirable of all forms of warfare since it adheres to the highest rule of war; namely, to overcome the enemy with least loss of one's forces and without destruction of his assets. We are all familiar with the fact that present U.S. foreign policy seems somewhat deficient on this point, whereas this is an area in which the military can validly supplement and implement the diplomatic and political arm of the state by the two-fold policy of:

1. Providing strong backing for the actions of these civilian branches.

2. By taking initiative directly, within the framework of their mandate.

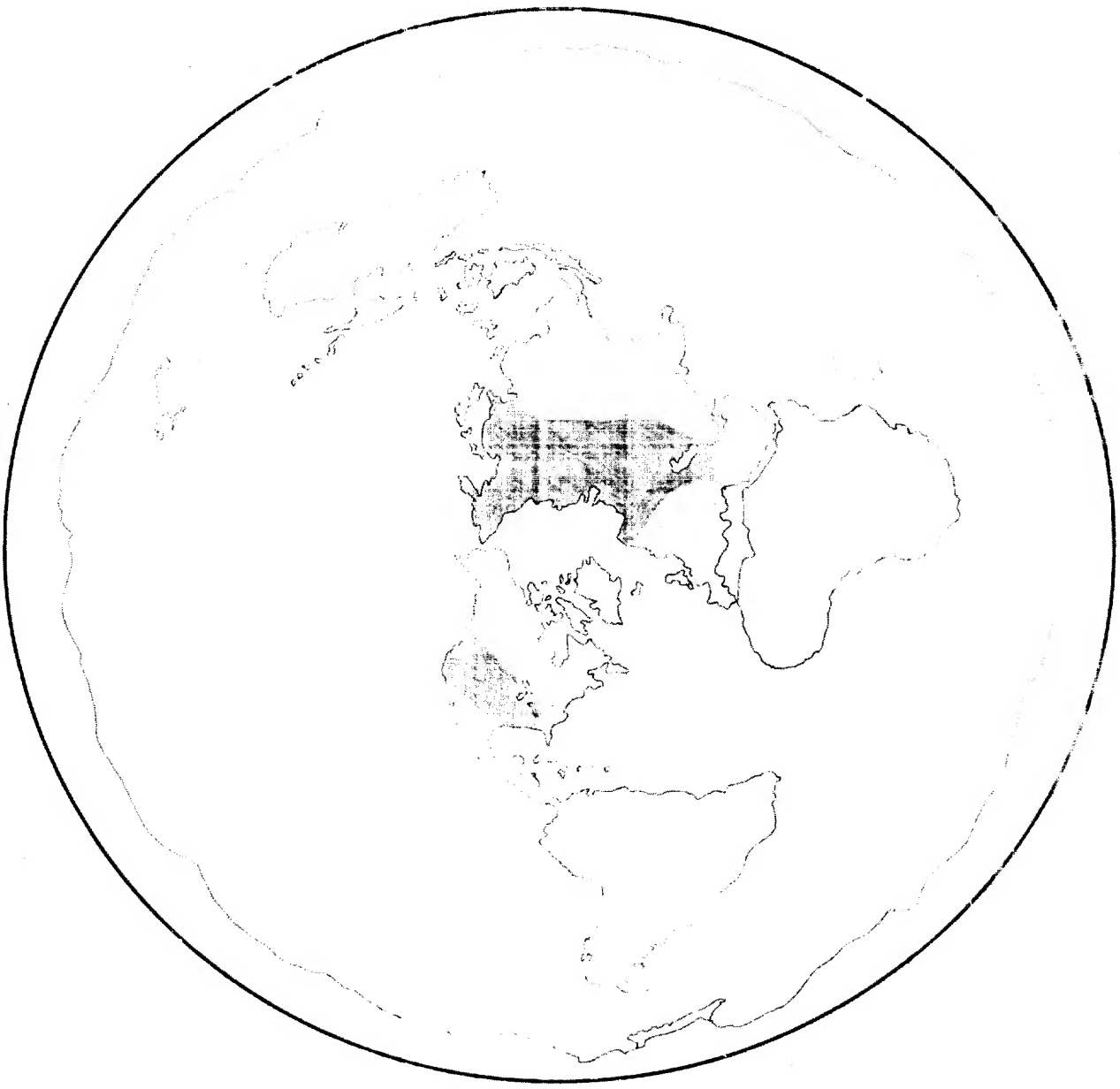
Figure 26 depicts the groups active in the present conflict as well as the zones of influence and the uncommitted nations.

The struggle itself is being waged by two groups, each of approximately 200,000,000 individuals: these in turn operate among a total world population of approximately 2.9 billion and attempt to form alliances or "bring over" to their side as large a segment as is possible of this population. It is obvious that neither of the two principal groups could operate or survive for long if surrounded by the balance of the world's population. It is also obvious that every group or nation swayed from neutrality to one of the two opposing camps has the double effect of enhancing the strength of one camp while constituting a definite and sometimes irretrievable loss for the other. The existence of this large leverage factor clearly indicates the importance of the psychological element in the present conflict.

In the psychological struggle, the aims of the U.S. can be clearly stated as follows:

- In the ideal case,
  - (a) Liberation of the communized nations.
  - (b) Neutralization of the U.S.S.R.
- In the worst case,
  - (a) Prevent the future expansion of communism.
  - (b) Bring about a weakening of the communist empire by internal discord or by promoting a re-direction of their aims.

It is thus extremely important to <u>induce</u> the <u>uncommitted</u> to <u>join our camp</u> or at least <u>not to adhere</u> to the communistic theory It is also very important to bolster the spirit of our allies. Many



THE TWO BLOCKS

Figure 26

AIMS OF PSYCHOLOGICAL WARFARE:

MAXIMUM: LIBERATION OF COMMUNIZED NATIONS.
NEUTRALIZATION OF USSR.

MINIMUM: PREVENTION OF FUTURE COMMUNIST EXPANSION.
INDUCE WEAKENING OF COMMUNIST EMPIRE BY: INTERNAL DISCORD OR REDIRECTION OF COMMUNIST AIMS.

Figure 27

of the neutral nations are just now coming of age, and although they like our way of life because of its human values and the obvious material returns, they distrust our methods. The U.S.S.R. offers a quick panacea for their growing pains, effectively backed by Russia's own experience in rising in four short decades from a quasi-feudal country to the second industrial power in the world. Through the strong mystic appeal of communism, these nations tend to see in the Soviet Union the underdog that through its own efforts made good. They also tend to associate the Western powers with the rich, fat owner of the plantation and the boss of the slave gang.

This naive view is greatly strengthened by each Soviet technological achievement, which corrobates the Soviet propaganda line that the Soviet Union has actually, due to the virtues of communism, surpassed the decadent, self-indulgent regimes of the West. Of all the technological achievments of which the Soviet Union can boast, space is one of the most impressive since it is self-evident to all who care to look, and since it is directly aimed at a deep human urge for expansion and conquest of the beyond.

It is fallacious to believe that the masses of Asia and Africa and of the European satellites are particularly impressed with the fact that the American family possesses "two refrigerators", since this goal is so far beyond their means as to be inconceivable and further, they will tell you they get along very well without even a single refrigerator. They are far more impressed with major exploits of a collective nature, such as space exploits.

It is imperative, therefore, that we deny to the Soviets this vast psychological advantage by producing exploits more

spectacular, so that, relatively, theirs may appear insignificant. The great danger is that some of the uncommitted may, by virtue of the amply broadcasted capabilities of the communists, "align" themselves with the communist bloc without expecting initially to be communized. As we know, this is only the first step on the slippery road to perdition.

Although it is difficult to assess the value in terms of psychological benefit of a successful space shot, a rough idea can be had by computing the advertising value of a significant space exploit throughout the principal media in the U.S. Figure 28 shows the estimated value of advertising space on a one-insertion basis in the four principal U.S. media for the Lunik III shot. A more staggering comparison can be had by reflecting that the advertising budget of large corporations runs between 1½% and 2½% of sales. On the basis of this computation, the value of "Soviet goods sold" in the U.S. as a result of a space shot like Lunik III can be assessed at between 300 and 500 million dollars. Reflecting that the gross national product of the non-socialistic world is approximately 1.5 times that of the U.S., total value of "Soviet goods sold" throughout the free and uncommitted world for each significant space shot can be estimated at close to one billion.

The opposite is, of course, also true: A successful U.S. shot denies the U.S.S.R. that advertising value in addition to having large advertising value of its own.

We do not wish to imply here that successful space exploits are the cure or panacea for the present world situation. We do

ADVERTISING VALUE OF A SIGNIFICANT USSR SPACE SHOT IN THE U.S.

	MILLION DOLLARS
NEWSPAPERS	3
PERIODICALS	1.5
RADIO	2
T V	1
	7.5
WORD OF MOUTH	?

Figure 28

state, however, that they constitute a very important backup to the necessary work of the civilian authorities in effectively counteracting communistic propaganda. Diplomatic efforts aim at convincing the uncommitted that our cause is worthwhile: display of strength positively affirms that association with us is convenient.

C. Technological and Scientific Strategy

Technological superiority is a principal determinant of victory in war. In this respect, it is interesting to speculate what would have happened to Hitler's army during its invasion of Holland in 1941 if the tiny Dutch army had been equipped with today s nuclear missiles. Technological superiority is not only a stockpile of weapons, but, more importantly, it is the fund of knowledge a nation possesses. The Battle of Alesia has been called by a number of historians "The Battle Won by Science". In this last great battle of the Gallic Wars, Vercingetorix, leader of the Gauls, manned the natural fortress of Alesia with 80,000 of his best troops. Julius Caesar, perceiving the fortress was too strong to storm, gave siege by encompassing the fortress with eleven miles of fortifications. Promptly, Vercingetorix sent messengers to the remainder of the Gallic tribes to come to his rescue. Caesar, having had intelligence of this summons, computed that within 30 days an army of perhaps 300,000 warriors would fall on his thinly distributed camp and close him in between themselves and the impregnable fortress. Instead of withdrawing, Caesar ordered a second, exterior line of fortifications to be built. In the construction of this line the great general included all the resources of the Roman military skill:

obstacles for horses, special impediments for man, proper disposition of the defensive bastions to assure minimum frontage towards the enemy and maximum fire coverage, etc. Just as the bastion was ready, the onslaught of 250,000 men struck. So skillfully were the fortifications contrived that the attack from outside wavered, allowing Caesar the carefully planned use of his German horse which quickly transformed the Gallic onslaught into a rout. This battle is particularly noteworthy since both contenders were nearly matched man by man for valor, for weapons, and for skill of leadership. What actually decided the battle was the superior engineering science displayed by Caesar's legions: science which was not the invention of the moment, but rather the long-accumulated knowledge of a people. Thus, by technological superiority alone, an army of 50,000 men could overcome an equally good contingent of nearly 1/3 of a million.

In more modern times, science and technology have been the spectacular tools of military power. Practically all the advances in the art of war and in the technique of persuasion by force have been the result of improving technology. The military must rely upon technology to furnish them more and better means for fulfilling their objectives. The military thus have the responsibility of participating in all types of scientific ventures, since no one can predict which new discoveries may result in the next increase in offensive or defensive power. The U.S.S.R. realizes this full well and has, therefore, embarked on a large scale program to unlock the secrets of space: uppermost in their minds, however, is how these secrets can pave the way to world domination. Allowing unilateral access to

this scientific potential could well mean the surrender of technological advantages required for our future national security.

It has also been abundantly demonstrated that technological advances initially fostered by the military have become civilian and industrial advantages and technological revolutions. In turn, these civilian improvements have the effect of strengthening the industrial framework of the nation, with beneficial reflections upon the military strength of the self-same nation. In general, if a person or group acquires skills in a most difficult task, he will find it relatively easy to accomplish simpler tasks. This is one of the reasons why efforts for the conquest of space will result in a general improvement in the technological level of the United States. Although the immediate payoff cannot be clearly seen at this time, we can be confident from history that one does exist. Conversely, we cannot allow the potential enemy to place himself unchallenged into a higher technological position, since we do not know what fruits in terms of military power his technological superiority will yield.

D. Economic Warfare

We are not here alluding to the economic values of planetary bodies which are as yet almost totally unknown and which will pose at best a very serious "freight" problem.

We are referring, rather, to current U.S.S.R. bids for economic relationships with the uncommitted, U.S.-friendly and even U.S.-allied nations of the world. U.S.S.R. success in these bids depends heavily upon the relative confidence placed by their prospective customers in the "ruble block" as compared with the "dollar

block". The effect of this economic onslaught on the part of the Soviet Union is two-fold:

1. To strengthen their internal resources.

2. It is a facet of their psychological warfare aimed at pulling uncommitted nations within their economic orbit, as a prelude to political domination.

Again, here exploits in any technological field, and particularly space, will act as a strong moral and psychological deterrent to uncommitted nations to trade with the Communistic bloc, for the simple reason that if we maintain predominance in the eyes of the world population we will be the most desirable group to trade with. For very much the same reasons, a builder prefers to give his construction loan business to a strong bank, even though slightly more expensive, knowing that the stronger financial institution will "carry him" in future more ambitions projects which the weaker bank may not be able to do.

CONCLUSIONS

We conclude from the foregoing discussion that the United States should proceed with a military program of space exploration and exploitation: further, the United States must lead in the space program.

We furthermore conclude that space has military value "per se" and that the advocated U.S. leadership must occur without regard to similar Soviet endeavors. In fact, a policy of merely counteracting every Soviet move is to be deprecated since it could possibly render the U.S. a victim of the Soviet Union's strategic plans.

Space has military potential in the four major areas discussed

above; namely, classical strategy, psychological strategy, technological strategy and economic warfare.

Of the military missions in the classical sense, there are at least four shown in Figure 15, which are strategically desirable and feasible in the relatively near future.

Of the more advanced missions, establishment of the lunar based LBBM complex appears as a strategic requirement: this lunar base, however, is of value if and only if we postulate development of an effective bullet-hit-bullet AICBM system on the part of the enemy. Lack of such a system would make moon base redundant since it would be akin to having a piece in the Soviet chess game threatened by two of ours. This would be contrary to the basic strategic tenet of economy of force.

As a natural consequence of the LBBM offensive complex, a strategic lunar weapons systems follows: this weapons system will consist of the primary elements - offensive LBBM, a defensive system against ALM, and the logistic complex to support such an operation.

CONCLUSIONS

SPACE HAS MILITARY UTILITY

- STRATEGIC
- PSYCHOLOGICAL
- TECHNOLOGICAL
- ECONOMIC

THE U.S. MUST LEAD IN SPACE EXPLOITATION

Figure 29

CONCLUSIONS

SPACE STRATEGIC MISSIONS

EARLY MISSIONS :

- RECONNAISSANCE
- COMMUNICATIONS
- OWN POSITION
- EARLY WARNING

LATE MISSIONS:

- LBBM COMPLEX
- STRATEGIC LUNAR SYSTEM

Figure 30

CONFIDENTIAL

CONFIDENTIAL

SENDER WILL CHECK CLASSIFICATION TOP AND BOTTOM

UNCLASSIFIED	CONFIDENTIAL	SECRET

CENTRAL INTELLIGENCE AGENCY

OFFICIAL ROUTING SLIP

TO	NAME AND ADDRESS	INITIALS	DATE
1	[redacted]		
2	211 Barton Hall		
3			
4			
5			
6			

	ACTION		DIRECT REPLY		PREPARE REPLY
	APPROVAL		DISPATCH		RECOMMENDATION
	COMMENT		FILE		RETURN
	CONCURRENCE		INFORMATION		SIGNATURE

Remarks:

Herewith is a copy of Dr. Castruccio's presentation on Space Strategy which you requested the other day upon completion of his oral briefing. Also attached is a brochure of the Aeronca Corp. and a covering letter addressed to you from Mr. Valenti. These materials were brought into me by Mr. William Watkins who is the Washington representative of Aeronca. Watkins has offices at 1001 Conn. Ave., N.W., Suite 622, Washington, D. C. Mr. Watkins stated that if you have any requirements which you would like to have Aeronca work on, he would be delighted to discuss the matter with you at any time.

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FROM: NAME, ADDRESS AND PHONE NO.	DATE
[redacted] Asst to the Director	11 Mar 60

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FORM NO. 237 1 APR 55 Replaces Form 30-4 which may be used. (40)

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